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THE MADRAS Forest College Magazine.

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The Chief Conservator of Forests offers a Prize of Rs. 30 for the best Essay by any Range Officer in the Madras Presidency or by any past or present student of the College on the following subject :-

> "Assuming that the minor forests (the grazing reserves and the poorer fuel forests) are entirely removed from the control of the Forest Department, what would be the best way to manage them, so as to ensure to them an adequate amount of protection."

Essays should be of not more than 2,000 words, and must reach the Principal not later than December 1st nor earlier than November 20th, 1923.

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Madras Forest College Magazine.

PUBLISHED QUARTERLY.

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Course of Lectures on

Forestry

Delivered at the Agricultural College, Coimbatore.

(By C. E. C. Fischer Esq., I. F. S.,)

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Lecture 2.

INDIRECT UTILITIES OF FORESTS.

Yet another form of protection afforded by forests is through the obstacle presented to the passage of air currents. The forest, here too, has a moderating effect both on the temperature and the force of the wind. We have seen that the forest modifies the temperature and the relative humidity of the atmosphere. It follows therefrom that winds passing through and over forests are corrected of extremes of heat

Wind.

cold and dryness. The benefit to habitations and cultivation lying to leeward of the forest is manifest. Hot dry blasts are rendered cooler and moister; cold winds on the other hand, are warmed. A wind that would shrivel tender crops through its heat, or its cold, or its lack of moisture, is rendered more or less harmless by its excursion through an extensive forest. In many widely separated agricultural districts this beneficial reaction of the forest is well understood and utilised for the protection of field crops. Notably is this so in Northern France and in Central Russia, where the local peasantry preserve belts of forest growth around their fields to obviate desiccation, reduce evaporation and retard the melting of the snow. The Belgian Minister of Public-works, speaking in the Senate a few years ago, declared that he looked upon trees as the best auxilliaries of agriculture in there capacity as wind breaks.

Protective belts of trees.

[1] "In consequence of the felling of woods on the Apennines, the Sirocco prevails greatly on the right bank of the Po in the Parmesan territory and in a part of Lombardy; it injures the harvests and the vineyards, and sometimes ruins the crops of the season."

[1] "In the valley of the Rhone, a simple hedge 2 yards high, is sufficient protection (against the wind) for a distance of 22 yards."

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1. "Man and Nature" p. 149- quoted from "Le Alpi che *cingono L'* Italia."
1. "Man and Nature" p. 149. quoting Becquerel.

Crops and dwellings are also protected against the violence of high winds by forest growth. For this reason tea and coffee planters in the hills of Southern India leave belts of forest in their plantations unfelled where danger from wind is to be feared. In this connection, I cannot do better than to read you an extract from a paper read before the Auckland Institute in 1910 on "the effects of the disappearance of New Zealand bush", by Archdeacon Walsh. It is based on experience and observations extending over a period of 40 years. I must premise that by the word "bush" it is not intended to indicate mere bushy growth; it is a term used in Australia and New Zealand as appoximately equivalent to the Indian word "jungle," and is usually applied to the original forest growth of the locality. The paper states: "But although the removal of the forest may not result in the diminution of the rainfall, it may nevertheless have some very marked effects on the climate. One of the principal of these is the increasing strength and dryness of the winds that blow during the summer months and which have become more and more injurious to vegetation. The cause is not far to seek, and its operation may be observed in any part of the bush district to the north of Auckland, and especially in the high rugged country, which was once the home of the Kauri pine. A few years ago, with the exception of some comparatively insignificant areas, this extensive district was covered with forest from shore to shore. The warm winds, charged with mositure from the ocean passed gently over the country without injury to the most delicate

New Zealand

plant; in fact, they were just what the native vegetation required for its full nourishment and growth. But with the destruction of the forest there came a change which is being intensified every day. The removal of the Kauri, and the settlers clearing, made way for the forest fires; and as these did not confine themselves to the portions artificially cleared, but worked their way into the standing bush, in a comparatively short time the greater portion of the country, especially along the backs of the high ranges, became denuded. Unless this bared land is immediately brought under cultivation, which is only done in the more fertile spots, it soon becomes covered with a clothing of fern and tea-tree scrub; and this in its turn is overrun by fire every dry season, each fire consuming some of the humus in the soil, and gradually reducing the land to barrenness, until at last the scrub becomes so light that it affords no protection to the ground from the sun's rays. The consequence is that on every clear day, from December to March the air is so superheated by the radiation from the baked soil that it rises in a column to the heavens, and a current is established to draw in a fresh supply from the lower levels. Every gully becomes a funnel up which the wind rushes in a tearing blast, becoming more and more desiccated as it travels; orchards are blighted, grass is parched up, and crops are prematurely ripened; while the remnant of the bush becomes so dried up that it is ready to be swept by the first fire that comes along. Old settlers will tell you that the seasons have changed of late years, and they fondly hope that after a certain cycle has run

its course the old state of things will return; but this will never happen until by judicious planting and cultivation something like the old conditions have been re-established.

But the effect of the wind is not only felt on the highlands, the draught commences at the coast, and is drawn up the estuaries and the long winding valleys that are a feature of the topography of many parts of both the north and the south Island. On the Hokinga River, which has a navigable course of over 25 miles for large vessels, and traverses an extensive settled district, it is noticed that the summer winds are much more violent than they were when the place was first occupied. Orchards and vineyards require more protection while along the banks the native bush has a parched and storm swept apperance that it never had in former times".

Again in the same pamphlet we find: "In the neighbourhood of Melbourne it has been noticed that the hot wind and dust storms, that are such a disagreeable feature of the Victorian climate, have lost much of their fierceness since the suburbs have been planted; while in the Waikato all old settlers are agreed the frosts have of late years not been nearly so severe as they were since the plantations of Pinus insignis, poplars, etc., which are so conspicuous in that district, have grown up."

After marking these words we may freely subscribe to the dictum: "By disafforestation man sows the wind and reaps the whirlwind."

In Southern India, fortunately, we are not concerned with avalanches in the sense usually attached to the word, that is to say accumulations of snow set in motion on steep alpine slopes which, ever increasing in mass and in breadth, hurtle down, carrying all before them, devastating whole country sides and sweeping away dwellings, fields, men and cattle in one common ruin. The avalanche is an ever threatening calamity in all mountain regions where much snow falls and where the slopes are steep. Forests alone offer security; and that not so much by arresting the avalanche on its march, as by preventing its coming into existence; for once started, by its sheer impulse, an avalanche is irresistible and trees are broken, mangled and swept down as readily as all other obstructions, merely adding to the general mass in motion. To realise the potent effect of the forest in suppressing avalanches we must understand how the latter come into being. Given a depth of snow over the mountains, which is the usual condition in such chains as the Himalayas, the Alps, the Pyrennees etc., all that is necessary for avalanches to form is that some small portion of snow near the crest should be set in motion. This may come to pass through a slip due to melting, through the disturbance of some passing animal, or some other such trifling cause. Snow being specially coherent, once a small mass is started rolling it soon gathers more; as it gains weight its descent becomes increasingly rapid and the hurtling mass collecting more and more weight and volume of

Avalanches.

Inception of avalanches

snow and developing velocity, is soon plunging down the declivities, carrying down rocks, trees, dwellings; thunderous, irresistible, pitilessly destructive.

Here as in the case of floods the role of the forest is to preclude the inception of the avalanche. The essential qualification of this disruptive phenomenon lies in the cohesion of the snow forming it. By the very presence of vegetation this cohesion is prevented; every stem, every shoot, by interrupting the continuity of the snow sheet, effectively breaks up the essential cohesion and opposes an obstacle to the first small motion that is the necessary precedent to the avalanche.

Inception of avalanches prevented

But avalanches are not invariably built up of snow. Any unstable slope unprotected by vegetation may be set in motion, and gravel, boulders and large rocks may come rolling down, crushing all opposition. Where the slopes are well covered such disruptions cannot occur, since their very inception is prevented. Single rocks, detached from cliffs by erosion, may be precipitated down the hill slopes, uprooting and breaking trees and clearing a track through the forest, but avalanches of large volume and composed of masses of boulders are effectively suppressed.

Land slides.

Another meteorological calamity practically unknown to the agriculturist of Southern India is the fall of hail, so destructive to field crops. As hail is due to the solidification of atmospheric moisture into ice under the influence of a high degree

HAIL.

of refrigeration, and as forests have a moderating effect on the extremes of temperature, it is only to be expected that they should be active in preventing the formation of hail to a considrable extent. That forests actually do render this service has been demonstrated beyond dispute. Near the Swiss town of Interlaken hail-storms were frequent at one time; since the denuded hill to the north of the town has been reclothed with forest the occurence of hail is rare.

Again in the neighbourhood of Lyons, in Southern France, hail storms were common formerly, but plantations made in the locality have converted the hail into rain.

Formation of hail.

The formation of hail-stones is connected with the electro-magnetic condition of the atmosphere. In tracts devoid of trees a high state of electric tension is set up which is favourable to the crystallisation of moisture into hail. Where trees exist, on the contrary, the conditions are less favourable, since the countless twigs offer innumerable points eminently fitted to facilitate the flow of the electric current along the stems and roots down into the earth. The tension is thus relieved and the formation of hail stones is prevented, or, at least, they are caused to fall before they have assumed dangerous proportions.

A close study of the path followed by hail-storms for a period of 18 years in certain districts, and for fifty years in others, has shown that woods protect the adjoining cultivations from this scourge.

Harbourage for Birds.

One of the principal dangers that threaten the welfare of field crops is the attack of *injurious insects*. You probably are more familiar than myself with the calculations which estimate the quantity and value of the loss suffered in India owing to these small animals. Any way you can easily gauge the importance of their detrimental activity by a perusal of the able works of Mr. Maxwell Lefroy and Mr. Bainbrigge Fletcher. And what is one of the chief protections against the too rapid increase of these harmful creatures? As you know it lies within the gaping beaks of insectivorous birds. Well! here again the forest affords assistance to the agriculturist. It is in the forest that our bird allies find harbourage in times of stress and shelter for the essential processes of nesting and multiplication. It may be assumed that in the absence of trees there would be a dearth of insectivorous birds and that in the absence of the latter there would be no dearth of phytophagous insects.

Soil fertility

We have already examined the question of erosion and silting, but I would like to approach it once again from the point of view of soil fertility and of navigation.

We have seen that fertilising silt is brought down from the heights above to the fields below. I take it that surface soil is not formed on the spot where it is used by plant life. but all that agricultural soil has been conveyed from a distance at a more or less,

remote period. There is a regular procession downwards which has been aptly termed, "the march of the hills to the sea."

Formation of soil

The weathering of rock goes on most rapidly, as a rule, on the heights, where the elemental powers have freer sway. The rock is disintegrated more or less slowly and its particles washed down more or less rapidly, being further refined and ground down by friction and chemical reaction as they descend, until they are reduced to fine sand or finer soil, according to their original nature. We have seen that the descent is rapid on bare slopes, and gradual where protection is afforded by woods. In the first case, the wash is apt to consist of large particles and to be infertile if not actively sterilising, and in any case is practically of pure mineral constituency. If, however, the slopes are covered with vegetation, the detritus is caught up and retained in the soil of cover, and is only allowed to descend very slowly. While lodged in the floor of the forest it is further acted upon by chemical substance and also by animals and becomes mixed up with vegetal debris. A great deal of it, if not the whole passes, together with vegetable matter, through the intestines of worms, termites and the like, and so is formed into a vegetable mould. This again lies in contact with the humus, which harbours myriads of micro-organisms—bacteria and fungi—, indefatigable workers that add nitrogen which they fix from the air. In the sum total, when this soil is eventually washed down it descends in the shape of fine rich soil in such excellent physical

condition that it brings renewed fertility to the fields below. Thence, after being drained more or less of its virtues, it slowly moves on, washed further and further down by rain and flood, to be itself replaced by newer formed silt, until finally it reaches the haven of the sea.

The forest thus maintains naturally the fertility of the soils, whereas bared slopes bring sterilisation sooner or later.

Silting and navigation

In the case of heavy erosion we have seen that largesized debris of gravel, shingle and even boulders are rapidly washed down to the valley bottoms. In their course they are reduced to smaller and smaller sizes by concussion and friction; the smaller the particles become the further are they conveyed. Arrived finally in the plains the rates of flow of the water is diminished owing to the more gentle slope and, consequently, first the coarsest and then the finer matter in suspension is deposited in large quantities. This deposition inevitably entails the silting up of rivers and estuaries and the formation of bars across river-mouths and harbours, to the embarrassment of shipping.

[1] "The delta (of the Po) has also advanced rapidly of late years (into the Adriatic Gulf); partly because the soil has been washed down from the mountain slopes in consequence of the reckless cutting down of the forests".

1. "The work of Rain and Rivers" by T. G. Bonney, P. 81.

At first sight this fact does not seem to be very closely concerned with agriculture, but a little reflection will show that it is indeed almost as vital as any other phenomenon.

Detriment to irrigation

Firstly in regard to irrigation, heavy silt obviously is an enormous drawback, not only in canals which may be rendered absolutely useless either for navigation or irrigation, but also in tanks the beds of which, if not regularly cleared out, are so raised as to leave room for but a trifling quantity of water. I would recall to you, in this connection, the passage previously quoted from Mr. Macartney's writing in reference to the tank at Sandur.

Inundations

Then rivers that silt up rapidly, as for instance the Indus, are prone to inundation and to carve out a new course cutting through cultivation, washing away towns and dwellings. Further, such rivers are rendered useless for navigation, that is to say for the cheapest means of transport for moving the harvest to the market.

Rectification of silting

To rectify these calamities costly public works have to be undertaken—reservoirs river training w o r k s—harbour works—in addition to dredging,–and enormous sums of public money are thus expended in most civilised countries. A tithe of this expenditure would suffice to bring about the same result through reafforestation, and nature, if not interfered with, would render the cure a permanent one.

No depth of masonry, no elaborate engineering works, whatever their magnitude, offer a final solution of the problem if they are not supplemented and assisted by vegetation. The erosion will go on, the silting will recur, necessitating constant repairs, constant dredging, further extension of groins and of retaining walls. The forest once established and protected goes on for ever. If man would only see what is placed so patently before him!

It has to be admitted, however, that matters have been allowed to proceed so far, the ruination of the slopes has gone on for so long, that in many localities preliminary strengthening works, of masonry, dry rubble or even of timber and of wattle and mud, must precede and support the restoration of the forest. But in no way does this detract from what I have said, or restrict the usefulness of the forest in this direction. Man has interfered so profoundly with natural conditions that he has caused abnormal conditions to become established, necessitating the employment of extraordinary measures if equilibrium is to be restored within a reasonable period.

Carriage of silt by rivers.

Enormous quantities of mud and detritus are transported by some rivers and it is precisely these, in contrast with fertilising rivers like the Nile, that cause sterilisation and floods. The Nile carries but a fraction of a pint of solid matter per 30 cubic feet of water, whereas the Var, a torrential stream issuing from the Pyrennees, contains 5½ pints of the same volume of its waters. The average annual deposit of fine sand torn from the Pyren-

nees by the Garonne and its tributaries amounts to nearly 1½ million tons. In the course of years vast quantities of sand have been thrown by this river into the Bay of Biscay. Not only has this reacted very adversely on the port of Bordeaux, but this sand is thrown up again along the coast by the waves and is blown thence inland by the Atlantic winds. A tract of country more than three miles wide and stretching 130 miles of coast line, has been converted into a sea of sand by this process. Here again, the only permanent preventative against further encrochment and the only means of bringing this sandy desert into use has been found in afforestation. Extentive plantations of maritime pine have been effected on the sands. Not only have the plantations checked its further spread but the pure sand is being converted gradually into soil. Further, the plantations themselves are a source of revenue to the owners partly by the sale of timber, but mainly from the turpentine and colophony obtained by tapping the trees.

Fixation of shifting sand

Pine plantations of Gascony

The fixation of shifting sands by tree growth is by no means unknown in India. In several localities Casuarina plantations have been successfully established to check the spread of sand.

Casuarina.

The first instance, as far as I know, is the plantation of Casuarina made by an enlightened merchant, the late Mr. Minchin, at Gopalpur on the coast of Ganjam, to protect his godowns that were threatened with being swamped by shifting sand.

Government followed this lead some years later at a point a few miles further north along the same coast. A small Casuarina plantation was entirely successfull in saving the fields of the Agusti Nowgan village. The sands had been steadily advancing and burying valuable agricultural soil. Within 3 or 4 years of its inception the plantation stopped all further invasion, leaving an abrupt wall of sand 20 feet high to mark the furthest point attained.

Another instance in the Madras Presidency is that of the Kuderisoli Teri in the Tinnevelli District. Shifting sands have been fixed at that place by plantations of *Casuarina, Acacia planifrons and Palmyra*.

Water Power.

The importance of maintaining a steady flow in the rivers and mountain streams instead of an alternation of sudden heavy floods followed by protracted spells of low water, is not restricted to its connection with irrigation, but is very essential in the use of water for the development of mechanical power.

One of the chief reasons that led to the closure of the saw mill near Mount Stuart in the Anamalais was that the river which supplied the power—the Tunacadavu Ar—is quite dry for three months in the year and contains an insufficient flow to run the mill satisfactorily for another 2 to 3 months.

Water in gravitational flow offers the cheapest source of power and its absence or presence has an enormous influence in the commer-

cial, industrial and social development of a country. Not only is it employed directly, as where actuating a water wheel, but also in the development of electricity.

HYGIENE.

Apart from their beneficial reaction on climate, forests exercise a considerable influence on hygiene. The capacity of certain trees to drain insalubrious swamps is admitted. A single eucalyptus tree is credited with the power to exhaust the surplus water from a quarter of an acre of marsh

Swamps dranied by plantations.

Boufarki.

The military camp of Erlon, at Boufarik in Algeria, located in a swamp, had been a death - trap for years. In spite of drainage and cultivation, up to 1842 it was notorious as the unhealthiest spot in the whole colony; the mortality from fever was 31%. Plantations of Eucalyptus, poplar, willow and plane were initiated, and by 1847 the death rate from the same disease had receded to 8%; in 1849 it had fallen to 3%. As early as 1856 the number of births exceeded the deaths, and in 1870 Boufarik had been converted from a nefarious swamp into a health resort.

Forests as germicides.

Forests oppose a far more efficient obstacle to the spread of certain epidemic disease than any preventive cordon. Not only is the sylvan atmosphere free of the germ laden dust, deleterious gases and noxious emanations of the towns, but the humic and ulmic acids of the forest soil are fatal to the bacteria and bacilli of such scourges as cholera, typhus, tetanus and carbuncle. In the forest

there are no stores of manure and organic debris to serve as hot beds for the incubation of pathogenic germs. This is a point of the greatest importance in connection with the supply of pure drinking water. Where the ground is bare of vegetation the water flows over the surface, carrying along any refuse it meets on its way and becomes tainted with deleterious organic compounds and infected with disease germs that may be lodged in them. In the forest, as we have seen, the water sinks into the soil covering and into the surface soil, passing slowly through the latter to feed the springs. No more efficient filter could be devised; its action is both mechanical in sifting out the grosser matter in suspension, and chemical in killing off morbid germs by the action of the acids of the humus.

Not only is the water purified, however, but the trees themselves purify the soil by breaking up toxic organic compounds into their component units, of which the essential elements needed for their nourishment are taken up by the roots and an innocuous residue is left.

Sologne.

A very good example of the health-giving influence of forests is forthcoming in a district of France–the Province of Sologne. While Sologne was covered with a fair proportion of forest it was populous and thriving. Overexploitation, over grazing and destructive fires put an end to the protective vegetation, and with it vanished health and wealth. The province was plunged into misery and

disease. A tract of 2,300 square miles became a centre of pestilence owing to the lack of tree-growth to absorb the excess water in the soil. Awakened at last to the seriousness of the situation, the people of Sologne established plantations of pines all over the region. In the short space of 30 years the fortunes of the unhappy province were restored thanks to the regrowth of forests, supplemented by drainage and canals.

The best way, nay the only way, of restoring its lost prosperity to a country ruined by excessive disafforestation—and we have examples of such in Greece, parts of Spain and of India, Asia Minor and North Africa—is by re-establishing tree growth in sufficient proportion.

The once fertile land of Turkestan was transformed into a desert by the extinction of its forests. The restoration of woods between 1880 and 1893 has made irrigation possible once more, and the climate is resuming its lost equability and hygrometric capacity. The population has increased both by excess of births over deaths and by immigration attracted from adjoining lands by the improved conditions. In thirteen years the population increased by 37%.

The example of the Landes country of Gascony, (already cited with regard to the invasion of sand first brought down by the rivers, then thrown up by the ocean and finally blown inland by the wind), is another case in point. Pent up by the barrier of sand the waters stagnated into a vast pestilent marsh extending over one seventh of the

area of the district. It was one of the unhealthiest localities of France, in which paludal fevers and the disease know as "pellagra" were rampant. Between 1857 and 1892 large areas were planted up and drainage works assisted in the work of amelioration. Health statistics showed immediate improvement; endemic diseases began to vanish; the death rate fell by 26% and simultaneously the birth rate rose by 12%.

But the improvement did not stop there, prosperity accompanied health. This erstwhile waste land of valueless swamp has been converted into useful agricultural soil estimated to be worth 240 rupees per acre.

Aesthetics.

We have now considered the various indirect utilities of forests from the material point of view and we may see if there is not a spiritual one, that is to say the æsthetical. Forests have their spiritual influence, their appeal to the sense of the beautiful and to the mind. It is assuredly better to live in a beautiful rather than in an ugly land, especially when the beautiful is also the source of innumerable other benefits. No one can deny that there is added picturesqueness in a landscape provided with forest growth. I do not propose here to detain you with poetic descriptions or with rhapsodies in praise of the forest beautiful, but it is a by no means negligible item in the catalogue of the value of the forest.

Nor is the æsthetical side without its material benefits. More than one country attracts visitors owing to the pleasure it affords to the

senses: the charm of beauty spots and the invogorating air, for both of which it is indebted to its woods in no small degree. Switzerland is the classic instance of a land so benefited. The thousands that flock thither in the holiday season of normal times provide probably the chief source of wealth in that favoured country. Also, do not a large number of Americans, as well as Europeans, visit the famed Yellow stone Park in the Western United States especially to see the giant Wellingtonias preserved there. On every holiday crowds rush out from the large towns—London, Paris, Berlin—to refresh their minds and bodies, cramped by their residence within city walls for all the week days, into the green woods near by: Epping forest, Fontainebleu and the Grunewald. The residents in the holiday resorts *profit substantially by the attractions* of their woods.

A TYPICAL DAY IN A FOREST RANGER'S LIFE.

:X:

Winning essay for the "Indian Forester Prize" for PAST Students —By, M.R.Ry., C. Balayya Naidu, Range Officer, Kodur Range.

It is a matter of common knowledge that the life of a Forest Ranger is one in which pleasure is ever mixed with hardship and fatigue. It must be within the experience of every Forest Officer to have had some striking experience in the discharge of his daily duties.

And the writer of these lines has had his share of such experiences, one of which he will now describe at some length.

It was on the 20th January 1919, while I was Range Officer of Chandragiri Range, Chittoor District, that I had the good fortune to do things, which afterwards made me remember that day as one of the memorable days of my service.

The previous day, on my return to Head quarters from camp, the post brought me an anonymous letter, stating that margosa trees were caused to be felled in the Mungilput Reserve by a rich villager of Bhimavaram, and that he would remove them if I did not make haste to the spot and seize them. As it was late that day for me to start out again and as I had just then returned from camp, I made up my mind to go there the next morning. Accordingly I set out from Chandragiri early in the morning on the 20th January 1919 and rode to Bhimavaram at a distance of 6 miles and reached it by 6 A. M. Leaving my pony behind, I walked to the scene of offence in the Reserve without loss of time. This Mungilpet reserve, over 40 square miles in extent, is a tolerably big one covering about one third of the extent of the forest area in the Range. It runs north to south and consists of a range of high hills rising about 2700 feet above the Sea level and containing a tolerably dense growth of various sorts of trees, shrubs and bamboos. While nearing the spot mentioned in the petition, I found the Forest Guard of the beat with his watchers and the village Taliaries there. The Forest Guard getting scent of the illicit fellings, went there the

previous evening with adequate help, found the trees felled down and watched them over night. In all 4 trees had been cut down. Three of them were Margosa *(Melia Azadirachta)* and one Konda Chigara (*Albizzia stipulata*), all useful timber for house-building. I seized all of them and made arrangement to convey them to the village to be handed over to the village munsiff, instructing the sub-ordinate at the same time to book the offenders, whose names were mentioned in the petition. From the enquiries instituted on the spot, I was able to find out the persons, who saw the fellings and who were in the position to give evidence in a Court of Law.

Having finished the work that had brought me to the place quicker than I anticipated, I proceeded into the interior of the forest, where the growth consisted of good timber yielding trees, among which, Yepi (Hardwickia binata) trees predominated and were in pole stage, with the promise of growing into huge ones in future years. It was a pleasant sight to see these young Yepi trees growing straight with their spreading crowns and ashy green coloured foliage mixed with the foliage of other similar growing species of light, dark and other green colours.

Entering the Bhimavaram working circle, I looked at the fellings done by a contractor for extraction of fuel and small timber from small coupes of about 100 acres each marked out under 30 years rotation in the proximity of villages for the benefit of the ryot population according to their requirements with facilities for transporting materials

at minimum cost and in spare moments. Most of the fuel is utilized for sugar cane boiling in the season. Small timbers were supplied at a cheap rate for agricultural implements and building purposes. Before I left the coupe, I satisfied myself if the contractor had fulfilled the terms of the agreement for feelling trees flush with the ground, smoothening the cut surface of stumps, clearing all shrubby growth, leaving all standards in tact without causing damage to them and forming a strong fence 4' x 4' round the coupe to protect it from grazing during the period of closure.

Taking advantage of the closure of these fuel coupes after felling, dibbling of seeds was undertaken to improve the existing stock, so that by the time the coupe was opened for grazing after five years, the dibbled seeds germinated, established themselves and had grown high beyond the reach of harm from cattle. To enhance the value of the forest in the range, sandal seeds had been dibbled in the felled coupes, which had germinated and were coming up well, promising to yield a good return in the coming years. The cost of this process is almost a negligible factor, as only a few rupees had been spent and if only a few trees succeed to reach the mature stage, the trouble taken in producing them would have been repaid manifold. This species would also spread to the nooks and corners of the reserve and to the surrounding country through their seeds, which the birds carry far and wide and through other agencies. Though this dibbling may not seem to be

beneficial at present, future generations will reap in abnndance the fruits of these labours.

I next stepped into the fire line traced round the working circle to protect the area from fire. Fire plays great havoc when it enters the forest, though it stimulates growth when it is applied cautiously. It reduces to ashes everything it touches and leaves behind it a dreary waste. It sets back all progress for some time. When such is the fate of an unfelled forest, the disastrous effect that would result on a forest with succulant coppice shoots after felling, where grass grows in abundance for the first few years owing to the removal of upper cover, need hardly be described. It was for protection from such a catastrophe, the line round this area had been fire-traced. The Fire-tracing consisted in clearing all grass and inflammable matter and burning the same throughout the length to the full width of the line, which, in this instance, was 15 feet.

Leaving the working circle, I climbed up the hills and went up to portions beyond the ordinary daily resort of human beings and cattle. It being then the month of January, the grass was quite ripe. After the penning of cattle in reserves was stopped, for fear of fire being set to them by the graziers the good results of such an action being strikingly visible on all sides in the unhindered flourishing state of undergrowth and in the undisturbed preservation of soil by not being trampled under foot. As I proceeded I came across different species of

growth some pure in crop, some mixed, some of luxurious growth, some stunted, some of the ever green species on the banks of ravines, and some of deciduous trees on the slopes and planes. I came across places of dense, medium and sparse growth and open places devoid of all growth and I admired the freaks of nature, which adopts different methods and ways in the arrangement and growth of forest vegetation.

When I surveyed the surrounding forest standing as I was on the smmit of a lofty hill, I thought of God, who, in His mercy, created the hills and mountains and clothed them with vegetation for the good and usefulness of animal kind. Thought after thought about the usefulness of the vast area of forest and its direct and indirect use in promoting the good of animal kingdom flooded into my brain. I thought how it makes rain fall abundantly on itself and on the surrounding country, lessens heat by increasing the humidity of the atmosphere, protects the soil, supplies water, retains moiture, maintains the flow of springs, prolongs the flow of streams in dry periods, prevents erosion of the earth's surface, reduces the flood in rivers, obstructs the silting up of tanks and rivers, supplies wood for house construction, agriculture, fuel, telegraph poles, furniture, railway materials and ship building, yields minor produce, minerals, medical herbs, and affords shelter to game. I also thought of various industries that could be started and worked for the good of the country such as the preparation of paper pulp from grass, bamboo, hemp, fibre and wood, match sticks from light wood like

Bombax Malabaricum, sugar, alcohol, vinegar, and many other similar commodities, which could be got out of wood. I was naturally overcome by a sense of sorrow at the sight of such abundunt materials lying unutilized around me.

I then got into the bamboo coupe, which was under working. The bamboo area in this reserve was divided into three parts, each of which was worked in one year by turns. It took me considerable time to see if the contractor was observing the conditions laid down for felling these bamboos, such as cutting one foot above the ground and above one or two nodes, leaving 10 columns in each clump and which are evenly distributed all over the clump, leaving no cut materials hanging to the clump, and heaping up all inflammable matter, without scattering them on the ground.

After completing this work, I went to the day's inspections which consisted in the inspection of a line cut for making a forest road. This was aligned with a Ghat Tracer in that portion of the hill where it was inaccessible for bullock carts to pass through and to carry loads. The formation of this road was found necessary to extract wood, fuel etc. from the other side of the hill where the produce was lying unutilized hitherto. By opening this road vast portions of the forest to the extent of several hundreds of acres were to be worked to the benefit of the surrounding village of the locality. The work of clearing growth 20 feet broad and grubbing out roots was satisfactorily done. The actual breadth of the road including the 3 feet wide side drain on the hill side

is 12 feet and the work of forming the road consisted in half cutting and half embankment with stone revetment of 1 foot broad to support it on the slope side.

At about dusk I reached Panapakam covering a distance of 25 miles from morning till evening; this is the distance roughly calculated from place to place. Many more miles I would have walked during the perambulation in the felled, dibbled and bamboo areas which was generally not taken into account, nor would it be possible to do so. So much of the day was spent in the region of the forest. Soon after my arrival at the camping place at Panapakam, the Range peon, who accompanied my things to camp, placed before me a bundle of covers received by post and locally from superiors and sub-ordinates. Opening all the covers, reading the references, orders, and reports, replying and passing orders thereon were the several items of business done in succession. This and the pile of papers sent from office by the Range clerk for disposal kept me engaged till after 8 P. M. After tiresome knocking about in the forest the whole day, this office work was really exhausting. And yet it had to be gone through and there was no escaping from it. Hand in hand with the forest inspection, the office work had to be attended to. Putting off any part of it, would result in arrears, which would not only upset the next day's programme but would bring discredit in its turn. With the writing of my diary for the day, the work for the day came to a close, which kept me fully occupied till late in the night.

"SANS DIEU RIEN."

MY FAVOURITE TREE AND WHY I LIKE IT.

:x:

[*Winning Essay for the "Indian Forester Prize" for* PRESENT *Students.—By, K. P. Rajalingam*, 1922-24 Dn.]

The subject of the present essay is one which is capable of various interpretations as divergent in meaning as wide in their application. For to quote a few the more important instances a tree may be favourite (1) from a sentimental point of view (2) for economic considerations (3) from a sylvicultural point of view.

It will be impossible, within the limits of the present essay, to discuss the subject in all its aspects but I shall endeavour to show which tree is my favourite as looked at from the points of view enumerated above and why it is so.

For reasons of sentiment I love all trees big and small, but the bigger the tree and the grander its appearance the more I love it.

The reason why is not far to seek and cannot be more aptly expressed than by these few lines:—

"I think I shall never see
A poem lovely as a tree
A tree whose hungry mouth is prest
Against the Earth's sweet flowing breast
A tree that looks at God all day,
And lifts her leafy arms to pray,

A tree that may in summer wear
A nest of robins in her hair
Upon whose bosom snow has lain
Who intimately lives with rain
Poems are made by fools like me
But only God can make a tree"

—JOYCE KILMER.

It will not be a groundless assertion to say that no tree better fulfils the ideal in this respect than the tree of my choice, the sublime Eucalyptus.

In considering the utility side of the question, we must clamber down from the pedestal of poesy to the realms of facts and figures and abandon consideration of the sublime for the more prosaic consideration of the every-day usefulness or otherwise of trees.

In discussing the usefulness of trees we must also consider the most useful way of being useful and must diverge from the theme of the moment to determine the latter.

Trees as providing timber are useful to man in many ways. They provide man with habitations and with fire to mention two of the most important, in fact, those which can be considered absolutely essential to life in this planet. Our duty, therefore is to find which of these is a greater necessity.

Thousands of years, ago, before man fashioned his rough tools and made himself houses of wood, he discovered fire. That was

the turning point of his life. Before, he was a beast sustaining and conducting himself as the beasts of the wild do, now he was different, he cooked his food. True, he lived in caves and ran about the primaeval forests like a beast, yet that discovery raised him a step higher and turned him in the right way to civilization.

Ever since fire has been an every day necessity to man. Without it man will again revert to his former bestial state.

It is not easy to imagine life without fire. Therefore the tree that supplies this need best is the tree that is most useful to man. Years ago when the gradual destruction of the sholas in the Nilgiris sent up a great cry from the settlers for fuel. Eucalyptus Globulus magnificently filled the breach and has stood by the people ever since. The cry was not for teak, the cry was not for Resewood and the cry came from the heart. What wonder then, that the tree that so wonderfully supplied the need and saved a whole district from desolation, has endeared itself to the population and has also become my favourite ?

We shall now proceed to discuss the sylvicultural side of the question.

A tree to be favourite sylviculturally, must

(1) Reproduce itself easily and readily
(2) Grow well without much tending
(3) Grow rapidly
(4) Be capable of resisting external injuries.

Applying these ideals to the tree of my choice we find that although it has been found impossible to make *Eucalyptus Globulus* reproduce itself naturally in the Nilgiris yet it coppices so readily and so well and lends itself so readily to planting out that it can safely be asserted that it satisfies this aspect of the question.

As to the growth of Eucalyptus Globulus one has only to look at the splendid plantations on the Nilgiris to see the best grown coppices and plantations, perhaps in the world, certainly outside Europe and America. It is the only tree that we know that grows straight as a ruler and is not influenced by the complicated light-coditions that other trees require.

Eucalyptus Globulus also grows most rapidly of all trees. Recent measurements made on sample trees in the Coonoor Peak Reserve show that planted specimens of the species have attained in fifty years a maximum height of 254 feet and a maximum girth of 11 feet 10 inches and average 197 feet in height and 8' $6\frac{3}{4}$" in girth.

What sure and more conclusive evidence is necessary ?

As to its capacity for resisting external injuries Eucalyptus Globulus owing to the presence of essential Oil is not readily browsed by Cattle or attacked by insects, and as it thrives at a high altitude is immune from the ravages of fire.

As to its tendency to be wind-thrown, this only occurs when it is grown on exposed ridge in an open crop and as this species

grows to advantage in closed crop, and if it at all happens is more the fault of the sylviculturist than the defect of the tree.

In considering the above points and looking at the subject from the above points of view I may conclude that Eucalyptus Globulus stands pre-eminent among all trees as my favourite.

"SPIRO SPERO"

A Key to the identification of some Shola (Eevergreen) trees of Karianshola, Mt. Stuart, South Coimbatore.

—:s:—

Based on Blaze Characteristics.—(Continued)

B (a) 1. Bark without Sap or Odour; stringy.

22

Chickrassia tabularis: Vern. Vedi Vembu.

Outer Bark: Reddish brown, with small rectangular scales, adherent to the trunk; bark $\frac{1}{4}''$ thick.

Blaze: Flesh red outside with a white fibrous inner bark; wood inside white. The brownish outer skin is very thin and easily sloughs off while blazing, exposing the flesh red characteristic bark.

Bole: Fairly straight and cylindric.

23

Diospyros Ebenum: Vern. *Karappu Kimaram*.

Outer bark: Sooty black, rough with small irregular scales adherent to trunk; bark ¼″ thick.

Blaze: White or very light pink turning to light brown on exposure; stringy bark.

Bole: Very irregular, fluted and with plank buttresses.

24

Hopea parviflora. Vern. *Kongu*.

Outer Bark: Reddish brown, scaling in long rectangular scales 4″ to 5″ long bark ¼″ thick.

Blaze: Light pinkish brown, stringy, wood slightly yellowish inside.

Bole: Straight, fairly cylindrical and long; big trees buttressed at foot.

25

Vitex altissma: Vern. *Maiyilai*.

Outer Bark. Grey (like Lagerstroemia) or greyish brown, rough with shallow pits; bark ⅓″ thick, somewhat stringy.

Blaze: Bright yellow. A gum exudes after a time.

Bole: Medium to big: long; crooked.

26

Hydnocarpus alpina : Vern : *Maravattai.*

Outer Bark : Dark grey with greenish white blotches, and horizontal lines.

Blaze : Straw coloured.

Bole : Short and irregular ; branches drooping.

27

Bombax malabaricum :—

Outer Bark : Brown with deep reticulate cracks. In young stem spring bark stringy ½" to 1" thick.

Blaze : Light rosy tinged white, turning on exposure to yellowish brown.

Bole : Straight, Cylindrical, huge with branches in tiers and whorls.

28

Unona pannosa: Vern. *Sennari Maram. Nedunari.*

Outer Bark: *Grey, very stringy* 1/10" bark.

Blaze: Stem dark brown with inside white.

Bole: Short and crooked; branches in whorls: leaves 2 to 3" by 1¼", ovate elliptic, acuminate; vein district below; blade crinkled.

29

Lagerstroemia microcarpa : Vern. *Vendekku.*

Outer Bark: Grey and most often blackish owing to the presence of its characteristic sooty pap ery

scales which sloughs off and sticks to the lower portion of the trunk; top portions naked and yellowish white in colour; thickness of bark about $\frac{1}{2}''$: very stringy.

Blaze: Very light dirty yellow; the cambium layer turns purplish on contact with iron.

Bole: Fairly long and straight.

30

Vern : *Emathali.*

Outer Bark: Reddish brown with small thin rectangular scales adherent to trunk; bark $\frac{1}{4}''$ thick stringy.

Blaze Flesh red: directly under outer stem a beautiful crimson coloured layer present: sometimes a yellow gum exudes.

Bole: Small, straight and cylindric; leaves: 2 ft. long 7 pairs, leaflets $6'' \times 2''$ oblique base, 10 pairs, prominent nerves underneath, round apex.

31

Pterospermum reticulatum:—

Outer Bark: Dark brown with close and long reticulation.

Blaze: Red, handsomely streaked with white lines, like streaked bacon; on exposure the white turns yellowish.

Bole: Huge, cylindric.

32

Eugenia hemispherica (?) E. Laeta ?. Vern. *Nagal.*

Outer Bark: Smooth and pale grey resembling *Anogeissus* bark; 1/7" thick, brittle or slightly stringy.

Blaze: Darkish grey very minutely reticulate; cambium turns purplish on contact with iron.

Bole: Fluted and buttressed at base; fairly long, and cylindrical; young leaves a beautiful light purple tinted.

33

B. (a) 2. Bark without Sap or Odour: Brittle.

Spondias mangifera: Vern. *Ambalam.*

Outer Bark. Pale greyish brown with feeble reticulation: Scales large, irregular, adherent to the stem; bark brittle 3/5" thick.

Bole: Straight, long and cylindrical, buttressed in big trees.

34

Cocylo stemon macrophyllus: Vern. *Vallai maram.*

Outer bark: Greenish grey, smooth blotched with green and grey patches bark 1/5"

Blaze: White with fine streaks of yellow; a little sap exudes. Blaze turns yellowish brown on exposure.

Bole: Short irregular; branches in horizontal whorls.

35

Canthium didymum: Vern *Veshayam Karai*

Outer bark: Teak brown: forrows with long shallow reticulate cracks: bark 1/6″ thick

Blaze: An outer layer of reddish brown bark over an inner dirty yellow wood blaze wood inside rough and reticulate.

Bole: Twisted to the right: short and irregular.

36

Schleichera trijuga: Vern. *Pooathi.*

Outer bark: Brown very rough with irregular scales adherent to the trunk 3/4″ thick.

Blaze: An outer Corky bark of greyish brown colour and an inner light dirty brown with yellowish brown streaks: After exposure the cut surface turns reddish brown,

Bole: Never straight; section irregular.

37

Vern. *Kottapidi.*

Outer bark: Brownish grey, the brown colour apparent under thin irregular scales usually sticking out on trunk; bark 1/4'', rough.

Blaze: Pinkish brown with fine reticulate white thread-like streaks; wood inside white.

Bole: Small, irregular.

38

Machilus macrantha: Vern. *Kolamavu.*

Outer bark: Grey: smooth; except for dark coloured lenticel-like tubercles scattered irregularly on the trunk: bark ¾'' thick: spongy.

Blaze: Pinkish brown.

Bole: Straight, cylindric, very big.

39

Hemicyclea venusta:— *Pulagani Maram.*

Outer bark: Grey ⅛″ thick: brittle.

Blaze: Light, dirty yellow, turning pinkish by exposure.

Bole: Very crooked and irregular; branches in whorls; leaves distichous, elliptic, acuminate 3″ × 1¼; veins indistinct: margin wavy.

40

Ostodes Zeylanica: Vern. *Perum choolai.*

Outer bark: Reddish brown with small rectangular scales (1″ × ½″) flaking off. Bark brittle ½″ thick.

Blze: Orange yellow, turning paler on exposure.

Bole: Small, fairly straight; leaves about 6″ × 2″ prominent below; crowded at the end of branches.

41

Scolopia crenata. Vern. *Salirai.*

Outer bark: Brown: rough with irregular adherent scales. 1/6'' thick.

Blaze: An outer reddish bark with an inner one yellowish whitish in colour.

Bole. Irregular with compound or simple spines, on young stem leaves pink in new flush.

42

Filicium decipiens: vern. *Váleria maram.*

Outer bark: Dark brown; very rough; peeling in irregular patches which are adherent to the stem.

Blaze: Pinkish: wood inside cream coloured.

Bole: Huge: cylindrical.

43

Croton Malabaricus:

Outer bark: Greyish brown with shallow long close reticulate cracks; bark 1/10″ thick.

Blaze: Pinkish brown with a yellow inner bark.

Bole: Small; fairly straight; leaves silvery grey below, ovate, petiole 3″ to 4″, blades 5" by 3" accuminate.

44

Nephelium longana: Vern *Poo-athi.*

Outer bark: Smooth dark brown, ¼" with fine lenticel-like tubercles.

Blaze Dark, reddish brown with fine white striation.

Bole: Medium size and irregular; leaves compound, 6 to 8, alternate leaflets, parallel veined and glaucous below.

45

Diospyros microphylla: Vern. *Anaikol.*

Outer bark: brownish black, blotched with brown and grey patches; ¼" thick bark.

Blaze: Dark flesh red; a transparent sea-green gum exudes after some days.

Bole. Straight, long and cylindrical. In old stems the base becomes irregular and fluted.

46

B (b) (1) Bark with a distinct foetid odour.

Hydnocapus Wightiana:

Outer brak: Greenish grey, blotched with white bark 1/7"

Blaze. A dirty red: inner wood dirty yellow.

Bole: Small, fluted.

47

Bark with a slight foetid smell.

Harpullia imbricata Vern. *Eèr-kol maram.*

Outer bark: Grey, smooth, with rounded knobby swellings across the trunk. Bark 1/4" slight smell present.

Blaze: Pale yellow, does not tarnish on exposure.

Bole: 3 or 4 stems arise together generally, fairly straight and long.

48

Aporosa or Diospyros ovalifolia: Vern. *Karimaram.*

Outer bark: Greenish grey, with longitudinal lenticel like shallow fissures. Bark 1/5", fœtid.

Blaze: Slightly pinkish yellow, streaked with broken white bands. Turns pinkish on exposure.

Bole: Fairly straight; a small tree.

49

Vern. *Karimaram.*

Outer Bark: Black with horizontal bands of warty excrescence across trunk, blotched with white patches; outer bark black; brittle, 1/7'' thick.

Blaze: Bright dirty yellow: a little watery yellowish sap exudes; wood inside pure white.

Bole: Straight, slender and very long, buttressed at foot, with plank buttresses.

50

Cleidion javanicum:

Outer bark. Grey with small tubercular excrescence: bark ¼'' thick: brittle.

Blaze: Light yellowish brown; wood inside white.

Bole. Short, irregular, branching low down.

51

Carallia lucida

(N. O. Rhizophoraceæ.)

Outer Bark: Light brown mottled with greenish grey blotche; very finely reticulate 2/5″ thick: brittle.

Blaze: A dirty yellow turning reddish on exposure.

Bole: Cylindrical: huge: buttressed, leaves 3″ to 4″ by 1¾″ to 2″, ob-ovate edges turned in near base, very coriaceous, pale on the under surface.

52

B. (b) (2) Bark without Sap but with a pleasant odour.

Alseodaphne semicarpifolia.

Outer Bark; Like mango; brown with reticulate cracks and irregular scales; bark 2/5″ thick; brittle.

Blaze: Light yellowish brown; a layer of yellow fibrous inner bark present.

Bole: Long, straight and cylindrical.

53

Dysoxylon binectariferum: Vern; *Sandanamaram?*

Outer Bark: Grey with rough corky surface. In old trees bark exfoliates in large irregular flakes; 1/5″ thick; smells sandal.

Blaze: Light yellowish brown showing one layer of darker yellow strata.

Bole: Short, fairly cylindrical branching low.

54

Cordia Obliqua: Vern; *Narivali.*

Outer bark: A lustrous greyish brown with thin irregular convex scales adherent to the trunk; bark ⅓" thick, stringy:

Blaze: Creamy white, turning on exposure to dirty yellow: slight odour not unpleasant.

Bole: Crooked and irregular up to 1 foot or 15 inches diameter.

55

Cinnamomum Zeylanicum: Vern *Lavanga páttai*.

Outer bark: Reddish brown coverd with small globular black tubercles; bark ½″ thick: brittle.

Blaze: A dirty reddish brown: A crimson coloured layer present under outer stem.

Bole: Long, straight and fairly cylindric.

—E. K. Krishnan, E.A.C.

The Ambasamudram Sholas.

:x:

(A poem composed by Mr. L. J. Taylor,—Range Officer, Kanikatti, on the contemplated working of the Ambasamudram Sholas.)

I

"Thy time is come, thou great and mighty growth,
Thy souls, if souls thou hath, prepare,
For, soon, they will be called upon to wander forth,
By daring men, who dare.

II

"Thy fates were sealed, by men whose is the task
To judge your worth, and then to pass
Your doom, 'gainst which, there's no repreive to ask,
For duty calls,—Alas!

III

"Mighty Gluta, your great and flaming heart,
Grained with golden bands so pure,
You're needed, at the world's great timber mart,
Your need, we do assure.

IV

"You others—Mesua, Dysoxylon,
There's work which you will be called to do,
Hopea, your worth is proved, go bravely on,
Balanocarpus too.

V

"So quail not, that your span of life is near,
Fare bavely forth to meet the saw,
Your lives are clean, there's nought you need to fear,
Your fates, what comes of war."

—L. J. TAYLOR.

Earthworms and Soil Fertility.

:o:

Though the study of earthworms is confined only to a naturalist, yet I think it should be interesting and useful to some extent to a Forest Officer, as the work of these animals enriches the soil thereby promoting the growth of vegetation. They appear to a layman to be quite useless except when he goes fishing, but if they were totally destroyed, it would be a great loss to the world. They help to make the soil previous to rain to a greater depth and assist the delicate roots

of plants, "by boring, perforating and loosening the soil." They draw leaves, stalks and other vegetable matter into their burrows and bring out earth in the form of the well known 'wormcasts.'

The body of the earthworm consists of a number of rings, each of which is provided with two bristles. The head tapers slightly to a point and is provided with a sensitive hook to pick up leaves etc. It has no eyes but the front portion is made sensitive to light. It has no ears but it is sufficiently sensitive to feel the slightest movement of the earth. It makes its burrow below the surface of the ground to a depth of 2 to 3 feet or sometimes even more. The hole near the surface is narrow but towards its end under the ground it is slightly bigger. Mr. Thomson says "In very loose soil such as ploughed land or garden-ground, the earthworm makes this burrow by simply boring its way down, head first and displacing the particles of earth. As it bores, the working of its body rubs the walls of the tunnel smooth, and a sticky secretion from the skin coats them over and hardens them, so that they do not fall together again when the worm has passed.

When the soil is at all hard or when it is bound together with grass roots, it is impossible for the earthworm to bore in this way and in that case it eats its way down." The soil thus taken into its mouth is ground into a fine powder which passes through the digestive tube in which it is mixed with bits of leaf and animal remains that are taken for food. When this earth comes out it is left at the mouth of the burrow as "wormcasts"

The earthworm remains concealed in its burrow during the day and comes out at night but even then it usually keeps a portion of its body within the burrow, and stretching the front portion, sweeps round the burrow and carries its spoil into its burrow. During the day the mouth of the burrow is concealed by leaves partly drawn into the hole. Other leaves taken into the burrow and having softened them by a sort of digestive juice, the worm eats them. The soil eaten supplies only very little food for the worm, the major portion consisting of decayed leaves and vegetable matter.

Mr. Gilbert White states the three ways by which the worms are " promoters of vegetation " as follows :—

1. " The burrows running as they do for several inches, and often for several feet, everywhere under the surface, allow the air and rain to penetrate through the soil, and they also make it possible for the delicate rootlets of plants to pierce their way down to a sufficient depth to find abundant food and moisture. The deserted burrows gradually crumble and collapse, and thus the whole soil is kept in very slow but continuous movement.

2. The numerous decaying leaves carried down into the burrows or buried under the heaps of castings on the surface enrich the soil and make it more suitable for plant growth. The digestive fluid, with which the worms cover the leaves, hastens their conversion into rich vegetable mould.

3. Castings of finely powdered soil are continually being brought up from below and thrown out upon the surface; for it is not alone to its burrow that the earthworm eats the soil; it does so at all times for the sake of the food particles contained in it, though it eats smaller quantities of earth where leaves and other vegetable matter are abundant. The whole surface is thus in the course of time covered over with a layer of fine rich soil brought up from beneath".

It may perhaps appear that what is stated above is an exaggeration and that so much work cannot be done by earth worms. Mr. Darwin actually experimented upon this. He had a part of a field covered over with broken pieces of Chalk and left it undisturbed for 30 years at the end of which period he found the layer of lumps of chalk 7" below the surface. Further he marked squares of land in different kinds of Country and every day he visited the squares, collected the wormcasts and dried and weighed them. He thus obtained 3½ pounds of castings in a year which worked out at 7 tons of dry earth per acre per year.

Mr. Darwin's own summary is as follows:— "when we behold a wide turf covered expanse, we should remember that its smoothness on which so much of its beauty depends, is mainly due to all the inequalities having been slowly levelled by worms. It is a marvellous reflection that the whole of the superficial mould over any such area has passed and will again pass every few years through

the bodies of worms. The plough is one of the most ancient and valuable of man's inventions; but long before he existed the land was in fact regularly ploughed and still continues to be thus ploughed by earth worms. It may be doubted whethor there are many other animals which have played such an important part in the history of the world as these lowly organised creatures." We should specially appreciate the work done by earth worms in our forest localities where the part of the ploughman is being naturally played.

S. RANGASWAMI,
Senior Student.

June week 1923.

Madras Forest College Monday 25-6-23 to Saturday 30-6-23.

:S:

The first day of June week at the Forest College opened with the Conservators' Conference. In the evening, there was a physical training display, given by a class of students selected from both divisions, after which the Mixed Doubles Tennis Touranament was played. Five couples entered for the event, which was won by Mr. and Mrs. Bennet from the First Circle.

The Conservators' Conference was continued on Tuesday. In the evening, Senior students Sankaran and Hadi Hussain met in the finals of the Fischer Cup Tennis Tournament (Singles). The

game proved very interesting, though Hadi Hussain won very easily by two love sets.

The Board of Visitors' Meeting was held on Wednesday and Thursday in the forenoon, while in the evenings the Final for Mens' Doubles Tennis Tournament and the Inter-Division Hockey Match were played. The Tennis Final was contested by Messrs. Wimbush and Whitehead, Conservators of the IV and II Circles, and Messrs. C. C. Wilson and W. C. Hart of the Forest College. The game was an excellent one and an exhibition of really good tennis. After a hard fight, the College beat the Conservators by 13 games to 11. Before and during the Tennis Mr. Wood Conservator V Circle as usual, very kindly entertained both staff and visitors to tea. The Inter-Divisional Hockey Match proved equally interesting and after a desperate struggle the Senior Division won by 5 goals to 4. The Junior Division are to be congratulated on their excellent performance, which considering that they have had a year's less training at the College than their Seniors was very creditable indeed.

The Annual Engineering Park Demonstration took place on June the 29th, when the students of both Divisions under Messrs. W. C. Hart and A. R. Brand gave some interesting displays in bridge building, erection of derricks, hauling and lifting logs, brick moulding, construction of a brick kiln and brick laying.

On the 30th of June last, which was the concluding day of the "Forest week", a large and distinguished gathering of ladies and gentlemen assembled in the Madras Forest College, to witness the distribution of Prizes, Medals and Certificates to the tenth batch of successful students. The year was unique in that the percentage of Honours and Higher Standard Certificates gained was the highest in the annals of this College, no less than *ten* having succeeded in getting Honours, and 14 Higher Standard Certificates.

To the disappointment of all, His Excellency the Governor, who was to have presided over the function, had to cancel his visit at the eleventh hour, owing to the death of a member of his staff. The Hon'ble Mr. R. A. Graham C. S. I., I. C. S., Member of the Executive Council presided in his place. Mrs. Tireman kindly gave away the Prizes.

Prominent among those present were:—

The Hon. Dewan Bahadur Sir K. Venkata Reddi Nayudu Garu, Minister, Development Department; H. Tireman, Esq., 3 Chief Conservator of Forests; H L. Braidwood Esq, I. C. S.; R. D. Anstead Esq, Rao Sahib M. R. Ry. C. S. Rathnasabapathy Mudaliar avl.; M. R. Ry. C. V. Venkatramana Ayyengar Avl., B. A. B. L., M. L. C.; Khan Sahib Syed Devan Abdur Razak Sahib Bahadur M. L. C.

It is gratifying to note that more than a dozen ex-students of the College were present this year, as against the usual average of

2 or 3. Mr. C C. Wilson, the Principal, opened the function with the following address:—

Mr. Graham, Ladies and Gentlemen,

"The day to which the students of this college look forward with apprehension and hope from their first entry has arrived. I fully expected once again to have the privilege and pleasure of welcoming His Excellency the Governor of Fort Saint George as our honoured guest. But at the eleventh hour he has had to cancel his visit owing to the untimely and deeply regretted death of Captain Alfrey a valued Member of His Staff.

"The Hon'ble Mr. Graham, Member of His Excellency's Council, has, therefore, very kindly consented to preside to-day at this, the most important of our College functions, instead of His Excellency, the Governor, and we offer him our very heartiest thanks for kindness in doing so.

"Last year I pointed out to you young Rangers of what great financial value, to the whole of this great Empire of which India is a part, are the forests in which your life rests; I dwelt on the vast timber resources of this great country, and I endeavoured to impress upon you the undoubted fact that the future of these forests and the possibility of converting them to the use of your fellow countrymen rested primarily with you; for it is our Rangers who have the greatest power for good or ill in the forests; and it is on them

and on their integrity, industry, and energy that depend the possibility of opening up and exploiting this property—which is of such infinite value. Remember all of you, when you have left the College, how great are your responsibilities and how much each of you individually can do to promote the welfare and prosperity of this great Motherland of yours.

"I know that many of you have at present high ideals and have every intention of working your best and doing your duty by your country; but in moments of discouragement and depression,—and of temptation,—it is so easy for one to lose sight of one's ideals. But do not let yourselves lose courage or be disheartened; and do not succumb to sordid temptations. We all know how easy it seems to make money by dishonest means, but it is not worth it. There are few things so valuable to us and which make so much for happiness in this world as a feeling of *self respect*; and this will be lost for ever once we allow ourselves to be overcome by any such sordid action. And again, though from a much lower point of view, the game is not worth the candle, the chances are very heavily against the dishonest subordinate; discovery and punishment are sure to follow in the long run with a subsequent loss of position and prospects in life. This principle that "honesty is the best policy" is a poor thing at best but there are, I am afraid some men to whom this is the only argument that will appeal, though I hope there are none such here.

"Remember also to conduct yourselves like *men*; you are not wanted to cringe and be subservient to your superiors; self confidence, independence and initiative are what appeal to one's superiors, so long as they are coupled with alacrity to obey orders, efficiency, courtesy and modesty. And once again while on this point let me impress upon you the fact that an arrogant and over-bearing attitude are in *no way* the measure of a man's independence; the true gentleman is courteous to high and low alike, in fact we find as we go through life that generally the higher a man's position is, the more considerate is he for those beneath him, *so long as they do their duty*.

"At this College we endeavour to train our students not only in the Science of Forestry but also to conduct themselves like self-respecting gentlemen of a truly independent spirit, and I earnestly hope that you young Rangers who are leaving the College to-day will bear in mind what I have said and will live up to your teaching at the College.

"Now I have above referred to the great value of our *timber* forests, to India and the Empire and while at the College it is of necessity that by far the greater part of your teaching has been directed to the Management of such forests; I say of necessity because it is with these that the *Science* of Forestry is *mostly* concerned, and it is with these that we find our greatest difficulties; therefore it is that your teaching has been concerned with, and your tours have been conducted in, such Forests more than in the less intresting

protective and fuel forests. Yet these are of very great importance to the country, and therefore to the Empire, and are of great—though indirect,—*financial value*

" To take first the protective Forests in which are included jungles so inaccessible that they cannot at present be exploited, the Sholas of the Nilgiri and the Pulni Hills and even the low scrub jungle which is situated on the lower slopes of nearly all our Hills in Southern India. I believe I am right in stating that all will agree with us as to the enormous value of these.

" In this advanced age in which we live it is a recognised fact and there can be no doubt that Forests conserve the water supply of a country; the moss, dead leaves and the humus on the ground hold up the moisture which falls in the form of rain mist or dew and allows it to percolate gradually through to the stream beds and so to flow eventually down to the plains were it makes agriculture possible, and thus *creates* the greater part of the revenue of this country, which is essentially agricultural. No one will dispute the fact that without water, agriculture would be impossible and as I have already emphasised, the conservation and regulation of the water supply depends upon the protection of such Forests as I have referred to above. And thus it is that our *protective* forests are of such enormous *financial* value.

" As regards our purely fuel forests, these too are of *very great* value. The ordinary ryot does not know and cannot understand this. Yet it is true; and you as Forest Officers *will understand*, and

agree with me. Now our present day policy seems to point more and more to management of these forests by the villagers for their own benefit-

" If this can be done without the deterioration and eventual disappearance of the forests nothing could be better; *we* would be freed from what has long been a " thorn in the flesh," and from devoting our energies to these hot uninteresting low scrub jungles, and the villagers would be freed from that terrible bogey the Forest Guard!

" In other countries village forests exist and thrive, and are in fact in many cases better and more intensively managed *by the villagers*, than are the Government Forests; and so why not in India?

" The difficulty here is that the villagers, when they think about the future at all, always look on their forest rsources as inexhaustible,—and their education will be a matter of *great difficulty*; but if they can be brought to see to what an extent their own *interests* are bound up in the fuel forests they will be as eager as anyone to treat them properly and to preserve them—for, the ryot, though uneducated is a shrewed enough fellow; the part then that you young Rangers have to play in this connection is to persuade, argue, demonstrate, with all the power and force at your command, in every village and small, town that lies near your forest area. *You know* the facts, they do not; in fact very few men outside the forest department do either know or appreciate the situation in its fullness.

" *You know* how very greatly it would be *to the interest* of a small community, to have its own little "Small-Timbor," "fuel" and "grazing" reserve, under proper management giving present use to the members of the community, *and preserving the benefits for future generations. You*, I say know the facts, and you know how easy such managment is; they the villagers don't, or won't, understand it. Well, on every possible occasion, do your utmost to teach them, to persuade them, to convince them. If in any small measure you succeed, so that some few of the Panchayat forests which are to be formed turn out well, you will not have worked in vain.

" But I must return to the work before me. The past year has been one of hard work successfully accomplished with few untoward incidents; and this makes it of little interest to the outside public though of much satisfaction to those in control. There have been few changes and few innovations.

" I am once again able to refer with pleasure to our cordial relations with our sister Institute, the Agriculture College, and with the Coimbatore Municipality. There has, I am glad to say, been no friction during the past year with either and in the case of the latter this is largely due to the never failing tact and courtesy displayed by their most able and popular Chairman, M. R. Ry. Rao Sahib C. S. Rathnasabapathy Mudaliar Avergal.

"The Public Works Department have, in spite of the financial stringency which ties their hands in every direction, provided us at last with that auxiliary water supply that we so greatly need.

"We have been visited during the year by His Highness, the Maharaja of Bobbili, G. C. I. E., C. B. E, by the Honourable Mr. A. R. Knapp, C. S. I., I C S, and on one or two occasions by the Chief Conservator of Forests.

"We have recently lost one of the ablest and most popular Instructors who has been at the College for many years, I refer of course to Mr. Robinson. His powers of organisation and knowledge of the Nilambur Forests were so badly needed in Malabar after the recent Moplah rebellion that it was considered necessary to transfer him to that District.

"Mr. Robinson, in addition to his other activities ran the Athletics of the College, and in this line during the past year we have been more than usually successful having been runners up and very nearly victors in the local Hockey Tournament; and having won the local Cricket Tonrnament within a few weeks of the new students of the Junior Division joining the College.

"The much prized Pentland Shield for general efficiency in Athletics has been won this year by Hadi Hussain, who I may say, has

worked hard for and thoroughly deserved his success; he is an all round Athlete of no mean calibre and, as is so often the case with such, is of a modest and unassuming demeanour which greatly adds to the attractiveness of his performances.

"The Marathon Race, an Athletic event in which all members of the College take part, was won this year by P. Madhavan Nair of the Senior Division; he did the 6, odd. miles in the very good time of 38 minutes, and thereby won the prize so generously given by M. R. Ry., K. Rama Rajah Mannarghat Moopil Nair Avergal, to encourage our young Rangers to presevere in that department of training which is so important for men in our profession. That his purpose has in this instance been achieved may be exemplified by the following anecdote, which I am sure Madavan Nair will not object to my relating. Soon after he arrived first at the college in 1921 he took part in the College Sports and entered for the "Mile". He was lying second and going strong at the end of the third lap when, quite suddenly, he dropped out of the race and sat down beside the course, and informed those who enquired what was the matter, that he had *never* run so far in his *life* before! And now he wins race of nearly 7 miles with ease, from some 60 young men of much his own age!

"The Interdivisional Challenge cup for this Race presented by the late Risaldar Major Amir Muhammed Khan Sahib was won, as it *usually* is, by the Senior Division. The fact that this is so is some

indication of the improvement in general physique and powers of endurance of the students which takes place during the first 18 months of their course.

" The Cowley-Brown Cup for the Inter-Divisional Hockey Match was also won by the Senior Division a few days ago after a most exciting game, in which the Juniors led for part of the time and kept level with the Seniors till near the end of the game.

The Inter Divisional Football Match was won by the Juniors after a most desperate struggle in the course of which one member of each side had to retire from the field!

"At the Athletic Sports on 21st October last there were some good performances and the record for the mile race was again lowered this year this time by P. Madavan Nair who did the distance in 1 and 2/5ths seconds less than the previous record put up last year.

The *Victor Ludorum*, a Challenge Cup presented by Mr. Richmond was won by P. Madavan Nair and T. R. Bushanam who tried for the first place.

" The discipline of the College has been excellent throughout the year. The Juniors, who came last August, have shown the usual improvement under strict discipline and hard work in the field and class, room. The Seniors who leave the College to-morrow are, I am glad to

say, a keen hard working lot of young fellows with plenty of initiative and self respect.

"The College tours have been carried out in accordance with the sanctioned programme and have been a success; this they could not have been had the Officers in the districts in which we toured not done all they could to help us. Certain Districts are more overburdened than others with College camps, and considerable extra work is thrown on them. We fully realise this and fully appreciate the efforts made on our behalf.

"Our most hearty thanks are due to the Conservators, District Forest Officers and Rangers who have thus helped us.

"The work of the students has been good. A higher precentage of marks has been obtained than is usual by both the Seniors and and Juniors in their periodical Examinations; and the results of the Final Examinations are also good, as is apporent from the results.

10 Students have obtained the Honours Certificate, 14 students have obtained the Higer Standard, and 5 students the Lower standard Certificates. None have failed. The percentage of Honours and also of Higher Standard Certificates is above that of normal years.

The prizes were distributed as follows :—

1. *The Campbell Walker Prize.* For the student who is likely to make the best all-round Ranger, won by

Sankaran.

2. *The Brazier Prize* for the student likely to make the best outdoor Ranger; won by

Hadi Husain.

3. *The Gold Medal* for the best Senior Division student on marks. presented by Government:--won by

Sankaran

4. *Silver Medals* for Honours presented by Government; won by:

Sankaran
Shankaranarayana Rao
Thiruvengadam Pillai
Robert Paul
Thimmaya
Surya Rao Naidu
Venkatasubbiah
Kuttappan Pillai
Dorairaj Pillai
P. .. Venkataraman

5. *The Madras Conservators' Prize* for Forestry, won by
Thiruvengadm Pillai

6. *The Lodge Prize* for Engineering, won by
Sankaran

7. *The Indian Forester Prize* for an Essay by past students. The subject was "Describe a typical day in a forest Ranger's life."

The Prize was won by the past student who chose as his motto.

"Sans Dieu rien"

Winner:-M. R. Ry. C. Balayya Naidu, Range Officer, Kodur Range.

8. *The Indian Forester Prize* for an Essay by present students. The subject was " My favourite tree."

The Prize was won by K. P. Rajalingam (Junior Dn. who chose as his motto " Spiro spero "

9. *The Chief Conservator's Prize* for the best student, in the Junior year won by K. P. Rajalingam of Ceylon.

10. *The Pentland Shield* for the best all-round Athlete in the College has been won by the Senior Division student.

Hadi Husain.

with Madhavan Nair second.

11. *The Fischer Challenge Cup* for Tennis has been won by Hadi Husain.

12. *The K. Rama Rajah Mannarghat Moopil Nair Cup* for the Marathon Race has been won by P. Madhavan Nair.

" 13. The Examination in First Aid to the injured held this year as usual, resulted in 29 students gaining certificates out of 29 who competed. This is a great improvement on previous years, and reflects credit on the Sub Assistant Surgeon Mr. K Kunhi Raman Nair of the Lawley Road. Dispensary who lectured to them. The certificates were distributed with the College Certificates.

" 14. *The Madras Forest College Certificates* have been awarded as follows:—

Honours Certifiicates.

Sankaran
Sankaranarayana Rao
Thiruvengadam Pillai

Robert Paul
Thimmayya
Surya Rao Naidu
Venkatasubbiah
Kuttappan Pillai
Dorairaja Pillai
P. Venktraman

Higher Standard Certificates.

Ayyanna
Vedanayakam
Madhavan Nair
Sundaresan
Jayakodi
Biram Singh
Gurucharan Singh
Hadi Hosain
Prithichand
Bose
Behera
Amos Demta
Rahamtullah Khan
Joshi

Lower Standard Certificates.

Samarawickrama
Patros Kandir
Nizami
Mumtaz Hussain
Vellodi

The Hon'ble Mr. R. A. Graham then made a short speech in which he regretted His Excellency's unavoidable absence that day, and eulogised the services of Mr. C. C. Wilson the Principal, who was going on long leave almost immediately, and expressed his conviction that Mr. W. G. Dyson who succeeded to the post of principal would keep up the good traditions of the College.

Mr. H. Tireman the Chief Conservator of Forests then spoke. He thanked Mr. Graham for his kindness in presiding at the function and urged the students of the College, for whom the address was mainly intended, to abide by the very sound advice given them by their Principal. He also pointed out that though the College had originally been constituted by Mr. Cowley Brown and worked up by him into a highly efficient Institution, yet if it were possible to improve on Mr. Cowley Brown's sound work Mr. Wilson had done so. He concluded his remarks by wishing the College every success under Mr. Dyson.

With a vote of thanks to the chair, the gathering adjourned to the ground floor where the guests partook of refreshments.

The Inter-Divisional Football Match.

(o)

The game was played on the College grounds on the 2nd June 1923. It was a pleasant evening with a light wind blowing. Captain Dyson, Vice-President of the Athletic Club was referee.

The Seniors confident of winning the day were rather careless. On the other hand, the Juniors realising their lack of practice played a steady game throughout. Within a few minutes of starting, the game developed into a very fast one, the Juniors soon scoring their first goal. The Soniors bungled over several chances and after a desperate struggle, shot a goal and thus drew level with their opponents.

An extra five minutes each way was given and in the first five minutes, the Junior Forwards pulled themselves together and kept the ball for the greater part of the time in their opponent's half, pressing hard all the while, where Rahim, their centre Forward, by a brilliant dash scored for his side the winning goal. The Junior Backs played a vigorous game and are to be congratulated. The Seniors tried their best to draw level but thier efforts were of no avail.

Thus the Junior Division won by two goals to one.

S. DORARAJA,
30-6-1923.

Miscellanea.

A Note on the Genus Butea by B. L. Gupta, M. Sc.

Forest Research Institute and College, Dehra Dun.

———(o)———

(Extracted from the Journal of the Indian Botanical Society for June 1923.)

The Genus Butea as defined by Bentham in 1865 (Gen. Pl. Vol. I, p, 533) and by Taubert in 1894 (Nat. Pflanzenfam. Vol. III, 3, page, 5) is said to contain 2 ovules in the ovary. Prain also in

his revision of the genus (Kew Bull. 1908, p. 385) gives the number of ovules as 2. All the floras so far as they have been seen, iuclud-ing the Flora of British India, also describe the ovary as 2 ovuled. Beddome however, in his Fl. Sylv. t 176 shows 6 ovules, although in the generic characters he states that the ovules are 2.

Recently while examining flowers of *Butea frondosa* Roxb. 4 ovules were noticed in the ovary and in order to be certain that this was not an abnormality a large number of flowers from different trees was examined. The result proved very interesting as it showed that the ovary in *Butea Frondosa* Roxb is never 2-ovuled. The number of ovules was found to vary from 4 to 7. In the great majority of cases, however, only 4 ovules were found, while less frequently 5, and in rare cases 7 ovules could be seen in the ovary.

Subsequently flowers of the following species of *Butea* were examined. The result is as follows :—

1.	*Butea Superba* Roxb.	4 ovules
2.	B. *Minor* Ham	2 ovules
3.	B. *pellita* Hook. f.	do.
4.	B. *parviflora* Roxb.	do.

Thus Butea *frondosa* Roxb. and B. *superba* Roxb. agree in having 4 ovules in the ovary, while the remaining species have only 2 ovules. This difference in the number of ovules together with other differences between Butea *frondosa* Roxb. and B. *superba* Roxb. on one side, and B. *minor* Ham., B. *pellita* Hook f. and B. *parviflora* Roxb. on the other, makes a brief consideration of the status and limits of Butea desirable.

The genus *Butea* was originally published by Roxburgh (Pl. corom. vol. I p. 21 in 1795 to include B. *frondosa* and B. *superba*.

In 1814 he admitted a third species B. *parviflora* (Hort. Beng. p. 53) which closely agrees with B. *superba* Roxb. in habit and foliage. It differs however in the colour and size of the flowers, the character of and relationship between the different petals and in the inflorescence being a panicle instead of a raceme, and has for these reasons been referred to another genus *Spatholobus* by various authors.

Butea minor Ham. in Wall. Cat. 5439 which in 1845 was made the basis of the genus *Meizotropis* by Voigt (Hort. Suburb Calcutta P. 239,) and B. *pellita* Hook, f. in Kew Bull. 1908, p. 385 have since been added to the genus. This latter species has been referred to section *Meizotropis* of *Butea* by Prain (KewBull. 1908, p. 384.)

In 1908 Prain (l. c. p. 385) on the discovery of B. *pellita* Hook f. reviewed the whole genus and in discussing the diverging views as to the status and limits of *Butea* Koen (based on B. *superba* and B. *frondosa*) of *Meizotropis* Voigt (based on B. minor) and of Spatholobus Hassk. (to which B. parviflora has been referred) wrote as follows:—

" That while Meizotropis agrees with *Butea* in which it is included by Bentham and Taubert, as regards color of petals, it agrees better with *Spatholobus*, which Bentham and Taubert refer to another subtribe, as regards the shape and relationship of the wings. Since the characters to be derived from the corolla are insufficient to warrant the generic separation of *Meizotropis* from *Butea*, they must be equally inadequate to warrant the generic separation of *Spatholobus* from the widened *Butea* in which *Meizotropis* is merged. The segregation of *Spatholobus* is so convenient that its perpetuation is desirable but it has to be recognised that this segregation depends

entirely on a difference of facies resulting from the possession of a greater number of smaller and differently coloured flowers, and is unsupported by any morphological characters."

The difference in the number of ovules between the two sections of *Butea* (*Eubutea* and *Meizotropis*) into which the genus *Butea* has now been divided, is an additional point and may be of sufficient importance to warrant the separation of *Meizotropis* from *Butea*. If *Meizotropis* is not separated from *Butea* but only given a sectional rank with it, it seems reasonable to accord a similar rank to *Butea parviflora* as a sub section of *Butea* owing to the close resemblance between them. In fact the resemblances are more marked between *Meizotropis* and *Spatholobus* than between *Meizotropis* and *Eubutea*

The grouping indicated above has already been adopted by Haines in his Botany of Behar and Orissa, Pt III (1922) p. 279. This arrangement however involves merging the genera *Spatholobus* and *Meizotropis* into *Butea*; the only reasonable alternative seems to be to treat all three as separate genera.

Extracts from "Industry" Volume XIII, 157, 1922 Dyed Trees.

Experiments are being made in the Weser district in Germany with a view to producing Coloured trees, and a striking initial success has already been reported. An area of several acres has been set apart for this purpose in a large forest near the town of Ulsar. Every tree in this area is hung with a receptacle containing red or blue colouring matter which is directed, by means of a rubber tube into the roots of the tree. Electricity also plays a part in the colouring process. The colouring matter makes its way within about four weeks, to the

utmost ends of branches and the smallest twigs, in some cases upto a height of twenty yards. The tree then dies off and is felled and cut into timber. The wood thus obtained is used for various purposes especially for the making of furniture. The part of the forest, where the experiments are being carried on, may already be noticed, from afar off, by the red or blue tint of foliage.

* * * * * * *

Safety from Radium.

Radium, the most mysterious and most powerful element known to science, which has the greatest power of all discovered sources of energy, has now been linked with safety movement and will lend its power to the prevention of avoidable accidents. So great is its power, that one gram is sufficient to raise a ton of water from the freezing to the boiling point. If one ton of it, were equipped to a ship of 1500 horse power, the ship would be propelled, at the rate of fifteen knots, for thirty years.

Radium is best known to the world, through its curative properties, in the treatment of cancer and through its commercial value in making radium luminious material. The power of radium was made known only a few years ago, through the efforts of a Polish women scientist and a French and an American professor. Radium now, treats thousands of cases of cancers annually preventing death and eliminating a great deal of suffering.

Radium's role in Industry, as a life-saver is less spectacular but perhaps even more important, than it is, as a therapeutic agent. The great mass of accidents in factories, in mines and other industrial institutions, whose darkness is a creator of danger, are being eliminated, though the newest invention of science—Radium luminious material.

Balance Sheet of the Madras Forest College Magazine for the year 1922-23.

Receipts.

Serial No.	Particulars.		Amount. Rs.	A.	P.
1	**Donations.**				
	(a) C. E. C. Fischer Esq. I. F. S.	5-0-0			
	(b) M. R. Ry. C. V. Venkataramana Ayyangar Avl M. L. C.	10-0-0			
	(c) 4 Officers of the Imperial Forest Service	35-4-0			
	(d) 26 Officers of the Subordinate Forest Service	52-0-0	102	4	0
2	**Annual Subscriptions.**				
	(a) Arrear Subscription for 1921-22 from 7 members @ Rs 2/-	14-0-0			
	(b) Subscription from 29 new members @ Rs. 2/-	58-0-0			
	(c) Subscription for 1922-23 from 252 old members @ Rs. 2/-	504-0-0			
	(d) Subscription for 1923-24 received in advance from 2 members @ Rs. 2/- each	4-0-0	580	0	0
3	V. P. P. Registration fee recoveries ...		31	15	0
4	Advertisements ...		88	0	0
5	By sale of 71 Copies of Mr. Fischer's "Key to the Indentification of trees etc" @ Rs. 1-2-0 each ...		79	14	0
6	Interest accrued on deposit in Bank ...		22	7	7
7	Balance at Bank at the beginning of the year		420	13	9
8	Cash balance with Treasurer ,, ,, ...		13	2	8
	TOTAL ...		1338	9	0

Expenditure.

Serial No.	Particulars.	Amount. Rs.	A.	P.
1	Printing and Binding charges ...	366	8	0
2	Cost of 200 Copies of Mr. Fischer's "Key to Trees etc" ...	121	11	6
3	Cost of 350 half tone illustrations (for September 1922 issue) ...	42	8	0
4	Cost of Paper ...	299	8	11
5	Postal and Telegram charges ...	114	12	0
6	Stationery and Sundries ...	16	13	0
7	Amount refunded to J. W. K. Wernham Esq., I. F. S. being excess received from him ...	5	0	0
8	Balance at Bank on 30-6-1923 ...	365	5	4
9	Cash balance with Treasurer on 30-6-'23 ...	6	6	3
	TOTAL ..	1338	9	0

G. VISVANATHAM,
Editor & Treasurer.

(Sd.) C. C. WILSON,
(President, M. F. C. Magazine.) 28—7—23.

Contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1.	Still-born foetus of an Elephant.	The District forest officer Nilgirs.
2.	One green viper	M. R. Ry. T. D. Ponniah, R. O Denkanikotah.
3.	One Ibex head with skin One Jackal head One box of wooden Tea articles. One album of photos of Trees. One bundle of botanical Specimens	S. Cox Esq. C. I E., I. F. S.

Additions to the Library.

1. The Indian Forest Records, Vol IX Part VI. The constituents of some Indian essential oils —By, J. L. Simonson.
2. Calendar for 1922. Forest Research Institute and College, Dehra Dun.
3. Revised Working Plans for the Matheran plateau Forests Division Kolaba
4. Report of the Forest Administration of the Central Provinces for 1921-22.
5. Report of the Dept. of Industries, Madras for year ending 31st March 1923.
6. Bulletin of yale University School of Forestry. 1922-23.
7. The outline of History—By, H. G. Wells, Vols I & II.
8. Notes of Lectures on Elementary Applied Mechanics for Junior Students—By, Col. H. D, Love.
9. *Presented by C. C. Wilson Esq., I. F. S.*
   (a) Geology of India—By R. D. Oldham.
   (b) Myriapods and Insects—By S. Sinclair and Sharp Part II.

(c) Insects—By, David Sharp Part II.

10. Working Plan for North Tongoo Forest Division for 1920-21 to 1928-29. By—A. M. M, Barrington, Vol. II With appendices I to IV.

11. Madras Forest Bulletin No. IV Notes on Sandal Spike Investigation of North Salem 1922-23—By, H. A. Latham Esq- I. F. S.

12. Ferns of British India and supplement—By Col. Beddome Presented by W. C. Hart Esq.,

13. Report of the operations of the Dept. of Agriculture, Madras Presidency for 1921-22.

14. Madras Agricultural Dept-, "year book" for 1922.

15. Bulletin No. 85 of the Madras Agricultural Dept. A Summary of the results of "the Experiments on paddy etc.

16. Abstract of the rules relating to Public Service Examinations, in the Madras Presidency upto 31—3—22.

17. List of trees, Shrubs, etc., in Burma.

18. Working plan for the Forests of Saharanpur Division, U. P. 1923-1933—By, E. Benskin, M. A. I. F. S

19. *Presented by S. Cox Esq., C. I. E. I. F. S.:-*

(a) A Manual of Indian Timbers—Revised Edition, By—J. S. Gamble.

(b) Practical mathematics for Forest officers – By, A. w- Lushington

(c) Structural Botany—By, Asa Grey.

(d) The Forest trees of Mysore and Coorg III Edition,—By, John Cameron, F. L. S.

(e) The Orchid grower's manual VII Edition—By, Henry Williams.

(f) The Ferns of Southern India, By, R H. Beddome.

(g) Journal of the Bombay Natural History Society.

Volume XIII No 1.
" XIV No. 1.
" XV No. 1.
" XVI No. 2, and No. 5

(h) Thirty six books for the Students' library.

Gazette Notifications

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17—4—1923.

1. Mr. O. H. C. Shelswell, Deputy conservater of Forests an extension of leave on half average pay from 8th December 1922 to 1st, January 1923.

2. M. R. Ry. A. R. Narasimha Iyengar avargal E. A. C., of Forests Madras, is granted leave on average pay for 1 month and 16 days from 12th April 1923 and leave on half average pay for two months and 14 days in continuation.

24—4—1923.

1. Mr. D. T. Barry, Acting Conservator of Forests, I Circle, leave on average pay, for 8 months from 19th March 1923.

2. Mr. H. Tireman, Conservator of Forests and Acting Chief Conservator, an extension of leave for 2 days on half average pay in continuation of the leave already granted to him.

3. Muhammad Abdul Karim Saheb Bahadur, D. F. O. North Vellore is granted leave on average pay for 1½ months from 18th April or date of relief.

4. M. R. Ry. A. Hanumantha Rao Avl., E. A. C. of Forests, to be in Charge of North Vellore Division during the absence of Mr. Abdul Karim Saheb Bahadur on leave or until further orders.

5. Under rule 81 of the Fundamental Rules M. R. Ry. V. Narayana Iyer Avargal, D. F. O. North Cuddapah, is granted leave on average pay for one month from the date of relief.

6. Saiyid Riazuddin Saheb, E. A. C. of Forests, North Cuddapah, to be in charge of the North Cuddapah division during the absence of M. R. Ry. V. Narayana Iyer on leave.

1—5—1923.

1. Mr. O. H. C. Shelswell, Deputy Conservator of Forests, leave on half average pay from 8th December 1922 to 3rd January 1923 in lieu of the leave granted to him.

2. Messrs J. W. K. Wernham, and D. Mc. D. Currie Assistant Conservators attached to the Nilgiris and South Mangalore division respectively are transferred to the Exploitation Division, Chenat Nair.

3. M. R. Ry. E. V, Padmanabha Pillai, E. A. C. of Forests, on leave is granted extension of leave on half average pay for one month in continuation of the leave already granted to him.

4. M. R. Ry. S. Ramaswami Iyer, D.F O. South Kurnool, will continue to be in charge of the division during the absence of M. R. Ry. E. V. Padmanabha Pillai, on leave.

8—5—1923.

The following promotions and postings of Forest Officers are ordered:-

1. Mr. T. A. Whitehead, Deputy Conservator of Forests to act as Conservator of Forests II Circle.

2. Mr. F. D. Ardagh, D. F. O. Palghat, to be D. F. O. the Nilgiris.

3. Mr. J. S. Conolly, Assistant Conservator of Forests attached to Guntur division, to be D. F. O. Palghat.

4. Mr. H. C. Bennett, Deputy Conservator of Forests on retorn from leave, to act as Conservator of Forests I Circle, from or after 10th May 1923 vice Mr. D. T. Barry, on leave or until further orders,

5. Captain W. G. Dyson, Deputy Conservator of Forests and D. F. O., South Coimbatore, to be Instructor Madras Forest College, Coimbatore.

6. Mr. M. F. Bridge, Deputy Conservator of Forests to be D. F. O., South Coimbatore.

7. Mr. G. C. Robinson, Deputy Conservator of Forests, and Instructor Madras Forest College, Coimbatore, to be D. F. O. Nilambur.

8. M. R. Ry. M. H Krishnaswmi Iyer Avl., E. A. C. is granted leave on average pay for one month and 5 days with effect from 1st May 1923 and leave on half average pay for 25 days in continuation.

9. M. R. Ry B. S. Keseva Vittal Avl., E. A. C. of Forests, South Mangalore is granted leave on average pay for 15 days from 21st April 1923.

10. M. R. Ry, E. V. Padmanabha Pillai Avl,. E. A. C. of Forests, on leave, is permitted to return to duty within the period of his leave and to take charge of the South Kurnool division on the fore noon of 10th May 1923.

11. M. R. Ry, S. Ramasamy Iyer Avl. D. F. O, South Kurnool, will, on relief resume his special duty on which he was engaged previously.

22—5—1923.

1. Mr. G. C. Robinson, Deputy Conservator of Forests and Senior Instructor, Forest College, Coimbatore leave on average pay for 3 weeks with effect from date of relief.

2. M. R. Ry. George Venugopal Avl., D. F. O. Tinnevelly, leave on Average pay for 2 months with effect from date of relief.

3. M. R. Ry. A. Hanumantha Rao Avl., D. F. O. North Vellore, on relief, to be D. F. O. Tinnevelly vice Mr. George Venugopal, Granted leave.

4. Mr. W. H. Woodhouse Adolphus, E. A. C. of Forests, will on the expiry of the leave be posted to the Vizagapatam Division as Assistant to the D. F. O.

5. M. R. Ry. V. Narayana Iyer Avl., D. F. O. North Cuddapah is granted an extension of leave on average pay for one month in continution of the leave already granted to him.

6. Saiyid Riazuddin Saheb Bahadur, will continue to be in charge of the North Cuddapah division until M. R. Ry. Narayana Iyer Avl., returns from leave.

29—5—1923.

1. Mr. C. Mahony, E. A. C. of Forests, and D. F. O. West Cuddapah, leave on average pay for 3 months and on half average pay for one month with effect from or after the 1st June 1923.

2. M. R. Ry, M. C. Chandy Avargal E. A. C. of Forests, on return from leave, to be D. F. O. East Salem Division.

3. M. R. Ry, P. Venkataraman Avargal, D. F. O. East Salem, on relief to be D. F. O. Cuddapah West division.

4. Saiyid Abdul Kadir Saheb Bahadur; D. F. O. Nilambur, is granted privilege leave for 3 months with effect from date of relief by Mr. G. C. Robinson.

5—6—1923.

1. Mr. C. R. F. Williams, D. F. O. Vizagapatam, to be Senior Instructor, Forest College Coimbatore, from or after 1st August 1923 vice Captain W. G. Dyson.

2. Mr. W. H. Woodhouse Adolphus E. A. C. of Forests to be D. F. O. Vizagapatam vice No. 1.

3. M. R. Ry, P. Venkataramanan, E. A. C. of Forests and D. F. O. East Salem, is granted leave on average pay for 3 months with effect from date of relief by Mr. M. C. Chandy, E. A. C. He will, on the expiry of the leave take charge of the West Cuddapah division.

4. Amir Padsha Saheb Bahadur, E. A. C. of Forests, Nellore, is posted to be in charge of the West Cuddapah division in relief of Mr. C. Mahony and until M. R. Ry P. Venkataramanan's return from leave.

5. M. R. Ry, A. V. Sundaram Iyer Avl. E. A. C. of Forests, to act as D. F. O, Chittoor vice Mr. R. B. Cornwell, on other duty or until further orders.

12—6—1923.

1. Mahammad Abdul Karim Saheb Bahadur, E. A. C. of Forests, is granted extension of leave on average pay for 15 days in continuation of the leave already granted to him.

2. M. R. Ry. A. Hanumantha Rao, Avl., E. A. C. of Forests will continue to be in charge of the North Vellore division until Mahammad Abdul Karim Sahib Bahadur's return from leave and then proceed to Tinnevelly and relieve Mr. George Venugopal granted leave.

19—6—1923.

1. In supersession of the orders already issued, Saiyid Riazudddin Saheb Bahadur, D. F. O. North Cuddapah division will on relief by M. R. Ry. V. Narayana Iyer Avl. take charge of the West Cuddapah division in relief of Mr. C. Mahony and until M. R. Ry. P. Venkataramanan's return from leave.

2. Amir Padsha Saheb Bahadur will continue to duty as Assistant to the D. F. O. Nellore.

26—6—1923.

1. Messrs. A. V. Sundaram and M. Srinivasa Raghavachariya are confirmed as Extra Assistant Conservators of Forests with effect from 23rd March 1923.

2. M. R. Ry. S. Ramaswami Iyer Avl., E. A. C. of forests, on probation, is confirmed with effect from 20th April 1921.

3. M. R. Ry. V. N. Seshagiri Row Avl., D. F. O. Nellore is granted leave on average pay for 6 weeks with effect from the date of relief.

4. Amir Padsha Saheb Bahadur, E. A. C. of Forests, Nellore, will take charge of the Nellore division during the absence of M. R. Ry. V. N. Seshagiri Rao Avl, on leave, or until further orders.

5. M. R. Ry. S. Ramaswami Iyer Avl., E. A. C. of Forests, South Kurnool, is granted leave on average pay for one month from date of relief.

6. Mr. H. R. M. Law, Assistant Conservator of Forests, will on the expiry of his examination leave, act as D. F. O. Chittoor in Relief of M. R. Ry. A. V. Sundaram Iyer Avl.

7. M. R. Ry. A. V. Sundaram Iyer Avl. will, on relief, act as Assistant to the D. F. O. Chittoor.

8. The leave on average pay for 15 days granted to M. R. Ry. B. S. Kesava Vittal avl., E. A. C. of Forests, South Mangalore Division is cancelled.

9. M. R. Ry. M. H. Krishnaswami Iyer Avl., E. A. C. of Forests, is granted extension of leave on half average pay for one month in Continuation of the leave already granted to him.

3—7—23.

1. M. R. Ry. A. R. Narasimha Iyengar Avargal, E. A. C. of Forests, will on the expiry of the leave, be placed on special duty in the chief conservator's office for a month to carry out the reprint of the code.

2. Mr. R. H. Mitchell, D. F. O., upper Godavari, is granted leave on average pay for one month and 13 days in continuation.

3. M. R. Ry. C. M. Kushalappa, E. A. C., of Forests, Ganjam is posted to be in charge of the Upper Godavari division, vice R. H. Mitchell granted leave or until further orders.

4. Mr. A M. C. Littlewood, D. F. O., Guntur is granted leave on average pay for 14 days with effect from 1st June 1923.

17—7—23.

M. R. Ry. B. S. Kesava Vittal avl., E. A. C. of Forests, South Mangalore, is granted leave on average pay for one month with effect from 12th June 1923.

24—7—23

1. Mr. L. S. Janes, D. F. O., Anantapur, is granted leave on avarage pay for two months from date of relief.

2. Mr. J. C. Wrench, Assistant conservator of Forests, Bellary, will be in charge of the Anantapur division during the absence of Mr. L. S. Janes, on leave.

3 Mr. C. E. C. Fischer, conservater of Forests, Third Circle, leave on average pay for eight months from 1st October 1923 and leave on half average pay for twenty months in Continuation.

4. Mr. R. B. Cornwell, Assistant Conservator of Forests, whose services have been placed at the disposal of the Government of India by the Government of Madras is appointed to hold charge of the North and Middle Andamans Forest division, with effect from the afternoon of the 19th June 1923, during the absence on leave of Mr. M. C. C. Bonington, Deputy Conservator of Forests.

31—7—1923.

1. Mr. E. M. Crothers D. F. O. Kurnool west, is granted leave on average pay for one month with effect from 2nd August 1923 or date of relief.

2. M. R. Ry. S. Ramasami Iyer, Avl,. E. A. C. of Forests, is posted to be in charge of the West Kurnool division during the absence of Mr. E. M. Crothers, on leave.

3. Under rule 81 of the Fundamental Rules M. R. Ry. B. S. Kesava Vittal avl. E. A. C. of Forests, is granted extension of leave on average pay up to the 25th of July 1923 in continuation of the leave already granted to him.

4. M. R. Ry. A. R. Narasimha Ayyanger Avl., Extra Assistant Conservator of Forests, is granted extension of leave on half average pay for two months in continuation of the leave already granted to him.

5. Mr. H. A. Irwin, Forest Exploitation Officer, Olavakot, is granted privilege leave for 2½ months from the 11th July 1923.

6. Mr. J. D. Connolly, District Forest Officer Palghat, to be in Additional charge of the current duties of the Forest Exploitation division during the absence of Mr. H. A. Irwin, on leave; but he will not be entitled for any charge allowance for the period he is in additional charge.

7. M. R. Ry. M. H. Krishnaswami Avargal, E. A. C. of Forests, will on the expiry of his leave be posted to special duty for the delopment of the Ambasamudram Range Forests in the Tinnevelly District.

8. Mr. R. E. Lemos, temporary E. A. C. will, on relief by M. R. Ry M. H. Krishnaswami, revert to his permanent post of Ranger, second grade, as the period of two years for which the temporary post of Extra Assistant Conservator was sanctioned in G. O. No. 1417, Development, dated 3rd August 1921, will expire on on 14th August 1923.

7—8—1923.

1. Mr. W. C. Hart, Senior Instructor, Forest College, Coimbatore, leave on average pay for 4 months from date of relief.

2. M. R. Ry. E. Krishnan Avargal, Instructor Forest College, Coimbatore, leave on average pay for 4 months and 13 days from date of relief.

3. 'Under rule 81 of the Fundamental Rules, Abdul Karim Saheb Bahadur, D. F. O., North Vellore, is granted leave on average pay for 3 months with effect from date of relief.

4. M. R. Ry. B. S. Kesava Vittal, E. A. C. South Mangalore. is posted to the charge of North Vellore, vice Abdul Karim Saheb Bahadur, granted leave

5 Mr. R. S. Browne Assistant Conservator of Forests, from Salem to South Coimbatore to work under the District Forest Officer.

6. Mr. H. A. H. G. Hicks, Assistant Conservator of Forests, from Salem to Nilambur to work under the District Forest Officer.

14—8—1923.

1. Mr. R. H. Mitchell, D. F. O. Upper Godavari leave on average pay for one month and 13 days with effect from 7th August 1923 and leave on average pay for 2 days in Continuation.

2. The follcwingpostings of Forest Officers are ordered.

   1. Mr. H. P. Ward, Assistant Conservator of Forests, to be Senior Instructor, M. F. C. vice Mr. W. C. Hart granted leave.

   2. M. R. Ry. C. M. Kushalappa Avl., E. A. C. of Forests, to be Jnnior Instructor Madras Forest College, vice M. R. Ry. E. K. Krishnan Avargal, Granted leave.

3. Mr. C. J. Van Haeften, E. A. C. and D. F. O. Lower Godavari Division, will be in charge of Upper Godavari Division in addition to his own duties vice Mr. R. H. Mitchell granted leave or until further orders.

Notifications relating to Rangers.

:x:

The following promotions in the class of Rangers are ordered:—

I.

With effect from 14th October 1922, *vice* Mr. W. S. Fernandez, Ranger, III grade reduced to the bottom of the IV grade.

To III Grade Permanent. Mr. T. T. Ansep, Ranger, III grade *Sub-pro-tem.*
To III Grade Sub-pro-tem. M. R. Ry. A. K. Kandan, Ranger, IV grade.

II.

With effect from 15th February 1923, *vice* M. R. Ry. C. D. Parathasarathy Chetti, Ranger, IV. Grade retired from service.

(i) Permanent.

To IV Grade. M. R. Ry. K. Tatacharya, Ranger, IV grade *Sub-pro-tem.*
To V Grade. M. R. Ry. P. Sithapathi Ayyar, (Supernumerary Ranger, M. R. with Honours.)

(ii) Sub-pro-tem.

To IV Grade. M. R. Ry. C. S. Ramanathan, Ranger, V Grade.

III.

With effect from 8th March 1923, *vice* M. R. Ry. R. Guruswami Ayyar, Ranger, I grade deceased.

(i) Permanent.

To I Grade. M. R. Ry. N. Swaminatha Ayyar, Ranger, I grade *Sub-pro-tem.*
To II Grade. M. R. Ry. A. Ranganayakalu, Ranger, III grade *Sub-pro-tem.*
To III Grade. M. R. Ry. J. S. Rowland, Ranger, III grade „
To IV Grade. M. R. Ry. S. Duraiswami Ayyar, Ranger, IV grade „
To V Grade. M. R. Ry. A. K. Kunhunni Nair, Supernumerary Ranger (M. R. with Honours.)

(ii) Sub-pro-tem.

To I Grade. M. R. Ry. P. Velayudham Nair, Ranger II grade.

To II Grade. M. R. Ry. C. P. Garudachala Mudaliar, Ranger, III grade.

Ta III Grade. M. R. Ry. N. R. Krishna Rao, Ranger, IV grade.

Ta IV Grade. M. R. Ry. P. Dhananjaya Rao, Ranger, V grade.

2. The names of Rangers M. R. R. Ry. P. Sithapathi Ayyar and M. R. Ry. A. K. Kunhunni Nair will be placed in the V grade above M. R. Ry. Govindaswami Pillai.

First Circle.

27—5—23.

1. M. R. Ry. A. Tirupatirayudu, Supernumerary Ranger, Parlakimidi Maliahs, on relief by M. R. Ry. A. Rama Hebbar, Ranger, is retransferred to Lower Godavari.

27—7—23.

2. Under rule 81 of the Fundamental Rules, M. R. Ry. A. Subrahmanya Iyer, Ranger V grade, Kistna District, is granted leave on average salary for nine days with effect from 3rd July 1923.

28—5—23.

3. (1) M. R. Ry. C. T. Tiruvengadam, Ranger V grade, on completion of the Vernacular Training School session to Upper Godavari for charge of Marrigudem Range.

(2) Mr. W. S. Fernandez, Ranger IV grade, Marrigudem Range to Lakkavaram Range on relief by No. 1.

(3) M. R. Ry. A. Manikka Mudaliar, Ranger V grade Lakkavaram Range to Ellore Range, Kistna district on relief by No. 2.

3. (a) On the expiry of the leave granted to him (23-8-23) M. R. Ry. B. S. Sankara Ayyar, Ranger VII grade is transferred to the Parlakimidi Maliahs for the charge of the Devagiri Range.

(b) On relief by No. 1 M. R. Ry. B. Veerabhadrachari Ranger VII grade is transferred to Ganjam District for the charge of the Berhampur Range.

Second Circle.

30—4—23.

4. The leave granted to Ranger M. Subrayalu Naidu III Grade, Kurnool West division in this office S. O. No. 36 of 23 dated 12—4—23 will be considered as leave on medical certificate for 5 months and 2 days on full average pay under article 81 b (ii) of the Fundamental Rules.

4—5—23.

5. M. R. Ry. G. N. Subba Rao, Ranger VI Grade is posted to work under the orders of District Forest Officer, Kurnool West Division.

5—5—1923.

6. The extension of leave of 1 month granted in this office S. O. No. 40/23 dated 29—4—23 to Ranger B. Punniah will be considered to be leave on average pay.

13—5—1923.

7. M.R.Ry. B. V. Jogeswara Rao, Ranger V Grade on return from leave (26—5—23) to take charge of Vinukonda Range from Mr. J. D. Connolly Assistant Conservator of Forests transferred to Palghat division.

26—5—1923.

8. The unexpired portion of the leave on average pay granted to Ranger B. Ponniah IV Grade is hereby cancelled and he will take charge of Bairluty Range as already ordered.

27—5—1923.

9. (1) M. R. Ry. N. C. Mahadevan Pillai Ranger III grade on return from leave is posted to Vinukonda Range, Guntur District.

(2) M. R. Ry. B. V. Jogeswara Rao Ranger V grade posted to Vinukonda Range is granted an extension of leave for 3 months from 26-5-1923 on Medical Certificate.

The leave allowances to be paid to the Ranger under the old leave rules should be decided by the District Forest Officer.

22—6—1923.

10. M. R. Ry. O. Venkataramana Ayyar, Range Officer, Bukkapatnam is granted one month leave on average pay from date of relief.

15—7—1923.

11. M. R. Ry. V. N. Subramani Iyer, Supernumerary Ranger, on special duty in Kurnool East Division is granted an extension of leave for one month on average pay in continuation of the leave already granted to him.

18—7—1923.

12. (1) Umapathi Mudaliar, Ranger, VI grade, Special duty, Kurnool West to Bapatla Range Vice Ranger T. Srinivasa Chari deceased. To join immediately.

(2) The Ranger should be relieved of his special duty at Kurnool if he has joined from leave, at once, and be directed to join at Bapatla forthwith.

20—7—1923.

13. (1) M.R.Ry. G. N. Subba Rao Ranger VI grade, transferred from the IV Circle is posted to Gundlabrahmeswaram Range.

(2) M. R. Ry. B. Krishna Rao, Supernumerary Ranger in charge of Gundalabrahmeswaram Range, is posted, on relief, to special duty in the Yerramalais.

26—7—1923.

14. (1) M. R. Ry. M. Umapathi Mudaliar, Ranger VI grade posted to Bapatla Range is granted an extension of leave on Medical Certificate for one month in continuation of the leave already sanctioned by the District Forest Officer, Kurnool West. He should join at Bapatala on the expiry of the leave now sanctioned i. e., on 13-8-1923.

(2) M. R. Ry. P. Dhananjaya Rao, Ranger, Sattenapalli will be in additional charge of Bapatla Range till then.

29—7—1923.

15. M. R. Ry. V. N. Subramani Iyer, Supernumerary Ranger attached to Kurnool East Division is granted an extension of leave for one month in continuation of leave already granted to him.

31—7—1923.

16. M. R. Ry. P. Gopalan, Supernumerary Ranger on other duty as Junior Instructor, Vernacular Training School, Cuddapah is posted to Kurnool South Division on Special Duty. He should report himself on relief at Vernacular Training School to the District Forest Officer, Kurnool South.

4—8—1923.

17. M. R. Ry. S. Chinnadorai Pillai,. Ranger II Grade, Giddalore Range Kurnool South division is granted leave on medical certificate for 3 months (privilege leave for 1 month and 11 days and furlough on half average salary under C. S. R. for the remaining period) from date of relief.

(2) Orders for his relief will issue shortly.

7—8—1923.

18. (1) M. R. Ry. Umapathi Mudaliar, Ranger VI Grade on return from leave is posted to Sattenepalli Range.

(2) M. R. Ry. P. Dhananjaya Rao, Ranger IV Grade Sub-prot-otem Sattenapalli Range is posted to Bapatla Range from the date of his relief by No. 1.

7—8—1923.

The following posting of Rangers is ordered.

19. (1) Mr. M. Hussain Khan, Ranger II Grade on return from leave is posted to assist Chenchu Officer's work and relieve Mr. V. T. Staggs.

(2) Mr. V. T. Staggs, Ranger II Grade and Assistant to, the Chenchu Officer on relief by Mr. Hussain Khan is posted to Giddalore Range, Kurnool South Division Vice Ranger S. Chinnadurai Pillai granted leave.

8—8—1923.

20. The following transfers of Rangers are ordered.

(1) M. R. Ry. C. Ramasawmy Naidu, Ranger II grade, Palnad Range, Guntur District is transferred to Sirvel Range, Kurnool, South Division; to join on relief by No. 2.

(2) M. R. Ry. A. Vyasulu, Ranger VII grade, Sirvel Range, Kurnool South Division is transferred to Palnad Range, Guntur District, to join on relief by No. 3.

(3) M. R. Ry. P. Gopalan, Supernumerary Ranger on special duty in Kurnool South Division will relieve Mr. Vysalu forthwith and be in charge of Sirvel Range until relieved by M. R. Ry. C. Ramasawmy Naidu.

9—8—1923.

21. M. R. Ry. C. G. Ganapathy Ranger, III Grade sub-pro-tem is granted leave on half average pay for 8 months and 15 days from the date of his relief (13—4—1923.) He should produce the medical certificate at once.

Third Circle.

1—6—1923.

22. The following is ordered.

(1) M. R. Ry. K. R. Viswanatha Ayyar Ranger IV grade on return from 3 months leave granted with effect from 27th March 1923 in this office Service Order No. 13 of 23 dated 27th February 1923 is posted to the charge of Balapalle Range South Cuddapah District – *to join forthwith on the expiry of the leave without availing of any joining time.*

(2) Mr. T. T. Ansep Rauger III grade in charge of Balapalle Range, South Cuddaph District on relief by No. (1) is granted leave on average pay for 2 months.

9—6—1923.

23. M. R. Ry. K. R. Viswanatha Ayyar Ranger IV grade in charge of Cuddapah Range, West Cuddapah District on relief of Range charge is granted leave for 3 months (leave on average pay for 1 month and 10 days from 27—3—23 and the rest leave on half average pay.

9—6—1923.

24. Ranger C. N. Narasimhachari is placed under suspension pending the disposal of the criminal case of bribery from 22nd May 1923, the date of sanction of the prosecution by the Chief Conservator of Forests.

25. The following posting and transfers of Rangers are ordered:-

1. M. R. Ry., K. M. Gopalachari Ranger III grade Sub-protem on return from the 2 months leave on average pay with effect from 19th April 1923, is posted to the charge of Odugathur Range, North Vellore District.

2. M. R. Ry., K. Raghurama Ayyar Acting Ranger VII grade in charge of Odugathur Range North Vellore District on relief by No. 1. is posted to the charge of Chamala Range Chittoor District.

3. M. R. Ry., V. P. Narayana Menon Ranger IV grade and temporarily reduced to V grade in charge of Chamala Range, Chittoor District on relief by No. 2 is posted to special duty under the orders of the District Forest Officer West Cuddapah District.

21—6—1923.

26. M. R. Ry. T. N. Seshagiri Rao Avl., Ranger I Grade Chingleput Range is granted leave for a period of 15 days with effect from 15th June 1923 or from date of relief.

22—6—1923.

27. The period of absence of Mr. E. W. Fernandez, Ranger, V Grade from 8—4—1923 to 30—4—1923 is treated as leave on average salary.

24—6—1923.

28. M. R. Ry. V. P. Narayana Menon, Ranger V. Grade, on relief of Chamala Range, Chittoor District is posted to the charge of Balapalle Range, South Cuddappah District in relief of Mr. T. T. Ansep, Ranger III Grade granted leave.

3—7—1923.

29. The following posting is ordered:-

(1) M. R. Ry. Raghurama ayyar, Acting Ranger VII Grade on relief of Odugathur Range, North Vellore District is posted to the charge of Balapalle Range, South Cuddapah District.

2. This cancels the posting of the Manager to Chemala Range, Chittoor District ordered in this Office S. O. No. 36/23 dated 9th June 1923 and the posting of M. R. Ry., V. P. Narayana Menon, Ranger V Grade to Balapalle Range, South Cuddapah District in this Office S. O. No. 41/23 Dated 24th June 1923.

7—7—1923.

30. M. R. Ry. S. Sankara Alwa Ranger VI Grade Permanent (and reduced temporarily to VII Grade) is granted leave on average pay for 2 months and 29 days from 23—7—1922 and leave on half average pay for 1 month and 4 days and extraordinary leave without allowances for 1 year 10 months and 26 days in continuation thereof with a lien on his appointment as Ranger VI Grade.

8—7—1923.

31. The three months' leave granted to M. R. Ry., K. R. Viswanatha Ayyar, Ranger IV Grade West Cuddapah District is extended by one month leave on full average pay on Medical Certificate under article 87 (e) of the leave rules.

10—7—1923.

32. Mr. J. A. Wilson Assistant Conservator of Forests will be placed in charge of the Mamandur from 1st of August for a period of 2 months.

He will then be placed in charge of the Palmaner Range.

16—7—1923.

33. 1. M. R. Ry., K. R. Viswanatha Ayyar, Ranger IV Grade on return from the 4 months leave granted with effect from 27th March 1923 is posted to the charge of Vontimitta Range West Cuddapah District.

2. M. R. Ry. H. Thammiah, Ranger IV Grade in charge of Vontimitta Range, West Cuddapah District, on relief by No. 1 is granted leave on average pay for 25 days.

24—7—1923.

34. The two months and 25 days combined leave granted to M.R.Ry., P. S. Varadakrishnamachari, Ranger V Grade in this office S. O. No. 29 of 1923 dated 28—4—1923 is extended by two months leave on half average salary.

The existing arrangements will continue.

28—7—1923.

35. Ranger K. R. Viswanatha Ayyar will be on special duty in West Cuddapah Division until the 20th August, when he will relieve Ranger T. Subbarayulu Naidu granted leave for 1 month from 21st August 1923.

2—8—1923.

36. 1. M. R. Ry., T. M. Doraiswami Pillai Ranger V Grade on other duty as Senior Instructor, Vernacular Training School, Cuddapah 1923 Session on completion of his duty is posted to the charge of Cuddapah Range, West Cuddapah District - to join after completion of drawing up of the final report on the session not later than 15th August 1923.

2. M. R. Ry. S. Vasudeva Reddiar, Ranger, I grade in charge of Cuddapah Range, West Cuddapah District on relief by No. 1 is posted to the charge of Sriharikota Range, Nellore District.

3. M. R. Ry. R. Alagiriswami Nayudu, Ranger, IV Grade in charge of Sriharikota Range Nellore District on relief by No. 2 is posted to *special duty* Nellore District to work under the orders of the District Forest Officer Nellore pending further orders.

2—8—1923.

37. 1. M. R. Ry. P. S. Varadakrishnachari, Ranger, V grade on combined leave for 4 months and 25 days from 4-5-1923 is on return from leave posted to the charge of Nellore Range, Nellore District.

2. M. R. Ry. A. Siddan Pillai, Ranger, IV grade in charge of Nellore Range, Nellore District on relief by No. 1 is transferred to the charge of Kavali Range of the same district.

3. M. R. Ry. T. Paramasivam Pillai, Ranger V grade in charge of Kavali Range Nellore District on relief by No. 2 is transferred to the charge of Kangiri Range of the same District.

4. M. R. Ry. T. E. Varada Achari, Ranger, IV grade in charge of Kanigiri Range, Nellore District on relief by No. 3 is posted to the charge of Chamala Range, Chittoor District.

5. M. R. Ry. V. P. Narayana Menon, Ranger, V grade in charge of Chamala Range, Chittoor District on relief by No. 4 is posted to the special duty in Chittoor District under the orders of the District Forest Officer, Chittoor.

7—8—1923.

38. Mr. P. Davis, Assistant Conservator is posted to the charge of the Madanapalle Range.

Fourth Circle.

1—5—1923.

39. M. R. Ry. V. D. Ramalingam Pillai, Ranger, on special duty, Namakkal Range, is granted leave on average pay for one month from 5-4-1923.

3—5—1923.

40. M. R. Ry. P. Mathuramuthu Pillai, Ranger, III grade is granted extension of leave on average salary for one month in continuation of the leave granted to him.

9—5—1923.

41. 1. Ranger Officer, Tirupatur is requested to relieve Ranger Mr. G. N. Subba Rao of Alangayam Range on or about the 11th instant and remain in additional charge till he is relieved by Ranger M. R. Ry. K. Jayarama Ayyar.

2. Ranger M. R. Ry. G. N. Subba Rao of Alangayam Range is granted privilege leave for one month from the date of relief by No. 1.

9—5—1923.

42. M. R. Ry. K. Jayarama Ayyar, Ranger, VII grade in charge of Chengam Range, is granted leave on average salary for 9 days from 2 to 10-5-1923 both days inclusive.

23—5—1923.

43. M. R Ry. K. P. Krishna Ayyar, Ranger I grade, is granted extension of privilege leave for 15 days in continuation of the leave granted to him.

29—5—1923.

44. M. R. Ry. S. Ramanuja Sesha Ayyangar, Ranger VI grade, East Salem Division, is granted leave on average salary on Medical Certificate for 2 months from 6-5-1923.

2—6—1923.

45. 1. Syed Munaver Sahib, Ranger V grade, in charge of Krishnagiri Range, is granted privilege leave for 3 months from date of relief.

2. M. R. Ry. L. R. Narayana Ayyar, Ranger, IV grade on return from leave, is posted to the charge of Krishnagiri Range to relieve No. 1.

5—6—1923.

46. 1. Pending the arrival of Range Officer Ramanujam Sesha, Range Officer Sithapathi Ayyar of Chitteri Range will hold charge of Karur Range in addition to his other duties.

2. Range Officer Sithapathi Ayyar should relieve Range Officer Rajagopal Nayudu who has been granted leave in this Office Service order No. 53 of 1923, dated 28-4-1923.

16—6—1923.

47. S. V. Sibgatullahi Saheb, Ranger V grade, sub-pro-tem, will be considered to have been on leave on average pay for 7 days from 2-6-1923 to 8-6-1923.

6—7—1923.

48. M. R. Ry. C. Rajagopal Nayudu, Ranger I grade, sub-pro-tem, East Salem, is granted extension of leave on average salary for 5 days in continuation of the leave granted to him.

24—7—1923.

49\. 1. M. R. Ry. S. G. Venkataramanan, Ranger V, *sub-protem* and Instructor on relief at the Vernacular Training School, North Salem, is posted to the charge of Shevaroys West Range to relieve Ranger M. Muthuswami Ayyar who will go on leave (on medical certificate).

2\. M. R. Ry. T. Perumal Goundan, Supernumerary Ranger and Assistant Instructor, Vernacular Training School, on relief at the Vernacular Training School, is posted to East Salem for special duty in Kallakurichi Range.

30—7—1923.

50\. M. R. Ry. K. P. Krishna Ayyar, Ranger I grade, is granted furlough on average salary for 4 months and on half average salary for 1 month on medical certificate in continuation of the leave granted to him.

31—7—1923.

51\. M. R. Ry. V. D. Ramalingam Pillai, Ranger VI grade, South Salem Division is granted leave for 3 months, i. e., leave on average salary for 13 days and leave on half average salary for the remaining period from the date of relief.

2\. M.R.Ry. T. R. Govinda Rao, Ranger V grade, is posted to the charge of Namakkal Range, South Salem Division, Vice No. 1 granted leave.

3\. M. R. Ry. S. Ramalinga Ayyar, Supernumerary Ranger on special duty to relieve T. V. Govinda Rao and hold charge of Vaiyampatti Range until further orders.

3—8—1923.

52\. M. R. Ry. M. Muthuswami Ayyar, Ranger, II grade, Central Salem Division, is granted leave on average salary for 3 months from date of relief.

Fifth Circle.

8—3—1923.

53. Mr. V. B. Salisbury, Ranger, II grade is granted four months leave on average pay under the fundamental rules, with effect from 4th March 1923.

11—5—1923.

54. Mr. A. R. Manual, Supernumerary Ranger, South Coimbatore District, is granted leave on average pay for 2½ months in continuation of the one month's leave.

12—5—1923.

55. 1. The suspension of Ranger Ramaswamy Ayyar is cancelled.

2. Ranger N. S. Eswaran will be relieved on the 15th June and Ranger Gulab Singh's transfer to South Coimbatore will hold good.

13—5—1923.

56. 1. Rangor M. R. Ry. K. Kunhiram Menon is granted 3 months leave on average pay from 10th June 1923.

2. Ranger Mr. Philip of Tinnevelly will act for Ranger K. Kunhiraman Menon, Kodaikanal Range, for three months from 10th Jnne 1923.

21—5—1923.

57. The three months leave on average salary from 1-2-1923 granted to Mr. K. Chaikku, Ranger, VII grade, South Coimbatore, is extended by 3 months.

11—6—1923.

58. M. R. Ry. M. Gulab Singh, Ranger, VI grade is granted leave on average salary for 1 month and 15 days and on half average salary for 15 days from date of relief.

12—6—1923.

59. 1. M. R. Ry. K Rangasami Naidu, Ranger III grade Madura Dt. is granted leave on average pay for 2 months from date of relief.

2. M. R. Ry. K. O. Anandan, Supernumerary Ranger, is posted to charge of Ayyalur Range Vice No. 1.

16—6—1923.

60. M. R.Ry. P. Ramaswamy.Ayyar, Ranger, VI grade, Palani Range is granted ? months leave on average pay from 1st May 1923.

27—6—1923.

61. M. R. Ry. P. Ramaswamy Ayyar, Ranger, VI grade, Madura District is granted 15 days leave on average pay in continuation of the 2 months leave on average pay granted in this office S O. No. 48/23, dated 16th instant from 1st May 1923.

62. M. R. Ry. K. S. Ramiah, Ranger, IV grade, South Coimbatore District is granted 3 months leave on half average salary from 11th June 1923 in continuation of the leave already granted.

14—7—1923.

63. As an emergency measure, owing to the sudden illness of Ranger M. R. Ry. Eswaran, Ranger, M. R. Ry. T. P. Palanikumaran is transferred from South Coimbatore to Kollegal to join at once and report himself for range duty to the District Forest Officer at Kollegal.

28—7—1923.

64. Ranger M. R. Ry. P. A. Madhavan is transferred from Tinnevelly District and should report himself to the District Forest Officer, Wynaad i. e. North Malabar at Manantoddy.

6—8—1923.

65. The leave on average pay for 2 months and 15 days granted to M. R. Ry. P. Ramaswamy Aiyar, Ranger VI grade, Madura District in S. O. Nos. 48 and 51 of 1923 is extended by 4 days.

1. Ranger M. R. Ry. P. Ramaswamy Ayyar is transferred from Madura District to learn shola regeneration work under the

Range Officer Kannikatti in Tinnevelly, so as to be ready to assist in doing such work next year in the extended operations.

2. Ranger M. R. Ry. K. O. Anandan is transferred from Madura District to do duty under the District Forest Officer, North Coimbatore, on sandal checking work or as the District Forest Officer deems fit.

Sixth Circle.

29—5—1923.

66. Mr. J. S. Rowland, Ranger III grade, Nilambur Range is granted leave on average pay for 4 months from 7th July 1923 or date of relief.

16—6—1923.

67. 1. M. R Ry. K. G. Monappa, Ranger VI grade, from date of relief in the Forest Exploitation Division to South Mangalore Division for special duty.

16—6—1923.

68. 1. M. R. Ry. C. Sankunni, Ranger I grade from Coonoor range to the charge of Nilambur Range, vice Ranger Rowland granted leave.

2. M. R. Ry. P. Kannan, Ranger, VII grade on special duty in Begur Range, Wynaad Division, to the charge of Coonoor Range, vice No. 1.

No. 2 to relieve No. 1 on 1st July 1923 and No. 1 to relieve Ranger Rowland in Nilambur on 7th July 1923.

2—7—1923.

69. 1. M. R. Ry. K. G. Monnappa, Ranger, VI grade is granted leave on average pay for one month with effect from the date of relief in the Forest Exploitation Division.

2. M. R. Ry. P. Madhavan Nair, Supernumerary Ranger posted to North Mangalore Division in this office Service Order No. 46 of 23 dated 18th May 1923 will work in South Mangalore Division until Ranger Monnappa joins.

Advertisements.

The following is a list of specimens required for the Gass Forest Museum. The Principal will be grateful to officers who can procure such of them as are available in their division The long panels should be approximately 5 feet long, 3 inches thick and as broad as available; the blocks 1 foot × 9 inches × 3 inches and the bark pieces about 6 inches square.

Species		Long panel required	Short panel required	Block required	Bark pieces required
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Aquilaria Agallocha	...	1	1	1	1
Albizzia procera	...	1	0	0	1
Acacia dealbatta	...	1	1	1	1
Acrocarpus fraxinifolius	...	1	0	0	1
Dillenia indica	...	1	0	1	1
Diospyros tomentosa	...	1	1	1	1
Diospyros paniculata	...	1	1	1	1
Diospyros Ebenum	...	0	1	0	0
Dalbergia sissoo	...	1	1	1	1
Erythroxylon monogynum		1	1	1	1
Gmelina arborea	...	0	1	0	1
Grewia asiatica	...	0	1	1	1
Holoptelia integrifolia	...	0	0	0	1
Hydnocarpus Wightiana	...	1	0	0	1
Hereteria papilio	...	0	1	1	1
Litsaea zeylanica	...	1	1	1	1
Machilus macarantha	...	0	1	1	0
Premna tomentosa	...	1	1	0	1
Sterculia foetida	...	1	1	0	1
Sterculia villosa	...	1	0	0	1
Sterculia guttata	...	1	0	0	1
Stereospermum chelonodios		1	0	0	1

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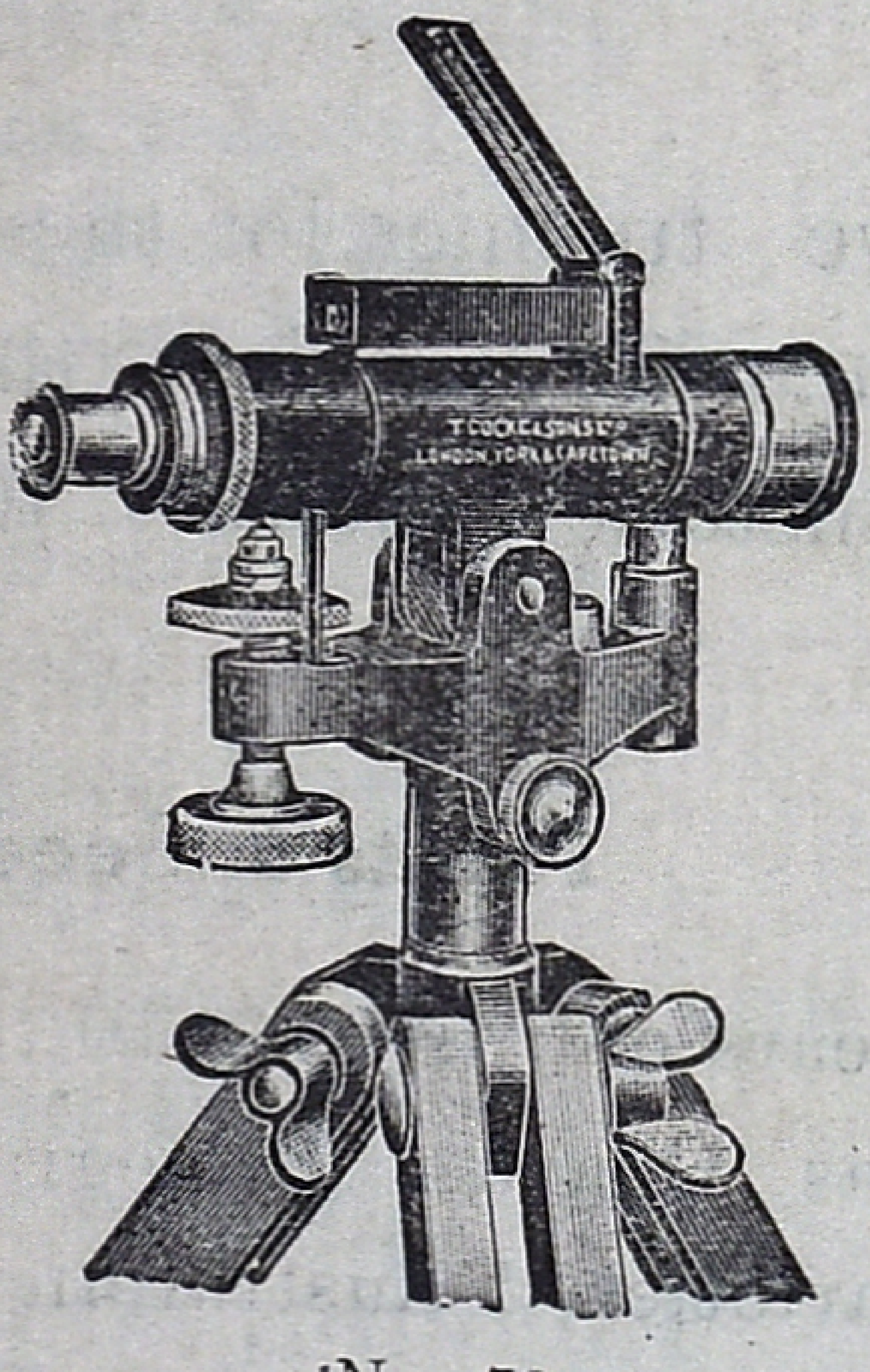

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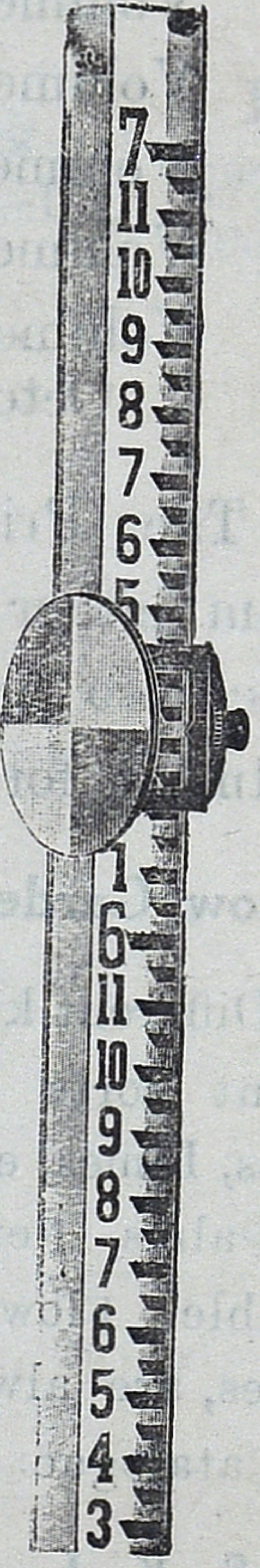

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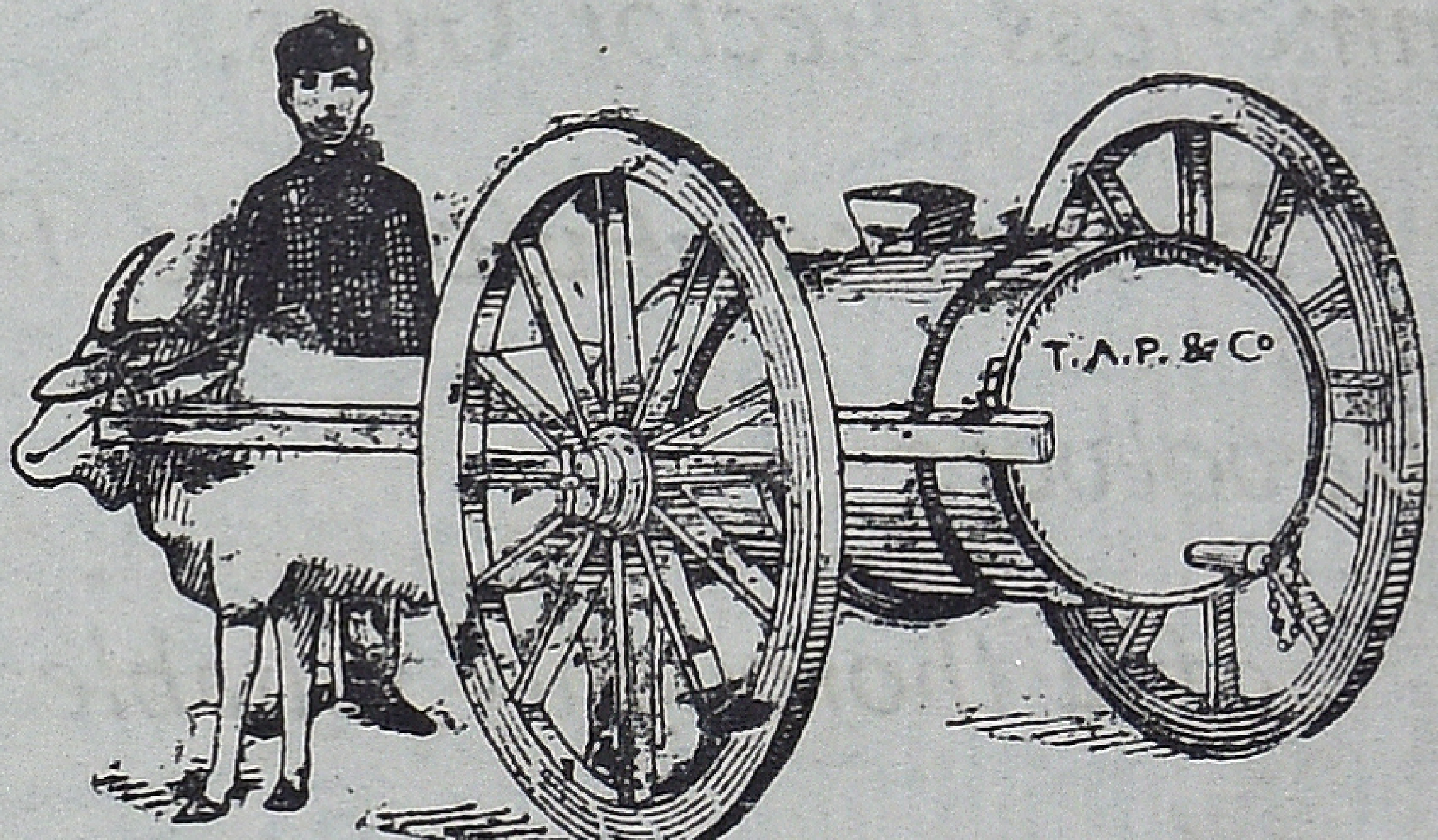

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